PROGRAM BUDGETING IN INTERNATIONAL ORGANIZATIONS: A COMPARATIVE ANALYSIS

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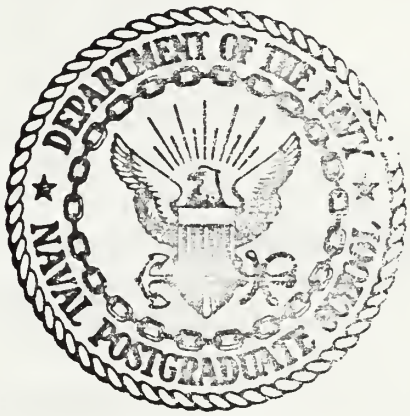

THESIS

PROGRAM BUDGETING IN INTERNATIONAL ORGANIZATIONS: A COMPARATIVE ANALYSIS

by

Daniel Earl Moser, Jr.

March 1975

Thesis Advisor: R. von Pagenhardt

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After three decades of rapid expansion, the United Nations family of agencies are both disparate and duplicative. They are in need of greater unity with due recognition of specialization and diversity. Cooperation and coordination have proved inadequate as each agency has evolved its unique procedures for program planning and budgeting as well as its own management information system. Unfortunately, these

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disparate modalities and discontinuities in data render more difficult the coordination of the activities of the entire system and frustrate its optimization. The writer describes such problems with historical perspective in each of the five largest organizations of the UN family. He then discusses and proposes the introduction of a standard planning and budgeting system to assist decision-makers in policy formulation and resource allocation. Techniques for achieving a better management information system and for conducting better analyses are described. On the basis of a comparative analysis, the writer offers a synthesis of the best from each organization and other sources.

Program Budgeting in International Organizations: A Comparative Analysis

by

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requirements for the degree of

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ABSTRACT

After three decades of rapid expansion, the United Nations family of agencies are both disparate and duplicative. They are in need of greater unity with due recognition of specialization and diversity. Cooperation and coordination have proved inadequate as each agency has evolved its unique procedures for program planning and budgeting as well as its own management information system. Unfortunately, these disparate modalities and discontinuities in data render more difficult the coordination of the activities of the entire system and frustrate its optimization. The writer describes such problems with historical perspective in each of the five largest organizations in the UN family. He then discusses and proposes the introduction of a standard planning and budgeting system to assist decision-makers in policy formulation and resource allocation. Techniques for achieving a better management information system and for conducting better analyses are described. On the basis of a comparative analysis, the writer offers a synthesis of the best from each organization and other sources.

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I. INTRODUCTION AND BACKGROUND

A. PURPOSE AND SCOPE

The idea for a thesis on how program budgeting techniques might best be applied to an international organizational system, specifically the United Nations system,[1] first came to the author when he was an intern in the Office of the Secretary of State. While a candidate for an advanced degree in operations research, the author had the opportunity to investigate close hand the extent to which program budgeting was being used in the United Nations system. As a result of that experience,[2] the writer decided that such a thesis could be a worthwhile contribution to the Department's efforts at policy coordination and budget review.

The purpose of this thesis is first of all to describe both what is desired and being achieved by introducing program budgeting into international organizations. An attempt is then made to relate the efforts of five organizations [United Nations (UN), Food and Agriculture Organization (FAO), International Labor Organization (ILO), United Nations Educational, Scientific and Cultural Organization (UNESCO),

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[1]The United Nations together with the specialized agencies and IAEA, which are all working for the promotion of economic and social goals set out in the United Nations Charter.

[2]The writer served in the Bureau of International Organization Affairs in May and June 1974, working primarily on an assessment of program budgeting efforts in international organizational systems.

and World Health Organization (WHO)] in program budgeting by pointing out some of the problems each organization has encountered. It may be shown that strict adherence to a theoretical program budgeting format and ideal procedures is, in the case of international organizations, impracticable. On the other hand, program budgeting may provide the most effective means for the coordination of the myriad activities of the growing number of international organizations and their member governments. The thesis will conclude by identifying the best aspects of each organization's program budget and where applicable, recommend improvements in program practices and documentation.

The writer begins in Section I by defining a number of terms used throughout the thesis. The second section is in three parts. In the first, the problem of management is specified in terms of international organizations. This is followed by a discussion of the program budget as a responsive technology. The third part tells the story of the Ad Hoc Committee established to identify problems in the management and financing procedures of the UN family.

The third section discusses the contributions of the Ad Hoc Committee as well as the implementation of its various recommendations by the five subject organizations.

Section IV presents initial findings drawn by the author in terms of problems of coordination and non-standardization. Chapter V speaks to the areas of potential improvement

within each organization, concentrating on analytical techniques for evaluation.

The sixth section offers a comparative analysis of the efforts of the examined organizations in an attempt to take the best from each and arrive at something better for all.

B. DEFINITION OF TERMS

While several of the terms used in this thesis are familiar, they are not always used by everyone consistently. It is therefore necessary to define these terms as they are employed in this discussion.

Program. An organized response to reduce or overcome one or more problems. Such response will include: (a) a specification of objective(s), (b) a selection of activities for their attainment, (c) the planned acquisition and utilization of resources and (d) criteria for the measurement of planned and actual achievements respecting (b) and (c).

Objective. A situation, condition or environment that decision-makers pronounce desirable to attain. In order to permit subsequent evaluation, a statement of the objective must specify: what, the extent, who, where and when. (a) What is the nature of the objective to be attained. (b) The extent is the quantity or degree of the objective to be attained. (c) Who is the particular group of people or portion of the society for which the attainment is desired. (d) Where is the geographic area for the program. (e) When is the time by which the objective or sub-objectives should be achieved. There are three types of objectives, each capable of meeting the basic definition:

1. Ultimate objective - a condition desired in and of itself pursuant to the value system of those responsible for the program. An increase in longevity for Black Americans equal to the white majority within 20 years is an example of an ultimate objective. (If specifications are lacking as to when or how, the desired end would only be a goal.)

2. Program objective - a statement of that particular situation or condition that is intended as a result of the sum of program efforts. This will not necessarily be an ultimate objective.

3. Sub-objective - an objective that must be achieved before the program objective may be attained.

Most programs will have many sub-objectives. It is also likely that various program objectives will contribute to the attainment of an ultimate objective.

Activity. Work performed by people, equipment and facilities in one or more organizations. The distinction between an activity and an objective may be seen by analogy with a bird: activity is the flapping of its wings; the objective is being at some desired place.

Resource: Personnel, materials, facilities and funds available to attract or support activity.

II. PROBLEMS IN MANAGEMENT OF PROGRAMS AND FINANCES

A. NATURE OF THE PROBLEM

The growth of economic and social activities both within and outside the United Nations system from the 1950's to the 1970's is one of the most significant characteristics of the post World War II era. United States federal expenditures on economic and social programs increased ten-fold, reaching a figure of nearly $120 billion in 1972.[1] Not surprisingly, funds made available through the United Nations have increased nearly ten-fold also, reaching an annual figure of over $1.3 billion in 1973.[2]

Article 55 of the United Nations Charter stipulates the economic and social responsibilities of the member governments in the following language:

> "With a view to creation of conditions of stability and well-being which are necessary for peaceful and friendly relations among nations based on respect for the principles of equal rights and self-determination of peoples, the United Nations shall promote:
>
> a. higher standards of living, full employment, and conditions of economic and social progress and development;
>
> b. solutions of international economic, social, health, and related problems; and international cultural and educational cooperation; and

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[1] National Tax Journal, March 1974, Vol. XXVII, No. 1.

[2] UN document E/5359, Annual Report on Expenditures of the United Nations System in Relation to Programs, 9 July 1973.

c. universal respect for, and observance of, human rights and fundamental freedoms for all without distinction as to race, sex, language, or religion."[3]

There are myriad means available to governments for the accomplishment of these goals, but one which offers multilateral cooperation and joint use of resources and machinery is that of resorting to specialized inter-governmental agencies. These functional agencies vary in form and charter. Eleven are designated "specialized agencies" by the United Nations and nine of these report annually to the Organization through its Economic and Social Council, namely:

International Labor Organization (ILO)

Food and Agriculture Organization (FAO)

UN Educational, Scientific and Cultural Organization (UNESCO)

World Health Organization (WHO)

International Civil Aviation Organization (ICAO)

Universal Postal Union (UPU)

International Telecommunications Union (ITU)

World Meteorological Organization (WMO)

Intergovernmental Maritime Consultative Organization (IMCO)

The remaining two, the World Bank Group (WBG) and International Monetary Fund (IMF), although specialized agencies,

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[3]Hogan, W. N. and Vanderbosch, A., The United Nations: Background, Organization, Functions, Activities, (McGraw-Hill Book Co., Inc., 1952) p. 348.

maintain more autonomy and otherwise stand apart from the others. The International Atomic Energency Agency (IAEA), which denies being more than an autonomous intergovernmental organization under the aegis of the United Nations, behaves as a specialized agency to further the peaceful uses of atomic energy.[4]

Other particular and functional organizations having their own juridical personality in the world, albeit established under the auspices of the UN General Assembly, include:[5]

UN Children's Fund (UNICEF)

UN Development Program (UNDP)

UN High Commissioner for Refugees (UNHCR)

UN Institute for Training and Research (UNITAR)

UN Fund for Population Activities (UNFPA)

UN Industrial Development Organization (UNIDO)

UN Conference on Trade and Development (UNCTAD)

UN Environment Program (UNEP)

World Food Program (WFP)

General Agreement on Tariffs and Trade (GATT)

In evaluating program budgeting in the United Nations System, this thesis will concentrate on the United Nations

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[4]Everyman's United Nations, (United Nations Office of Public Information, New York, 1959) p. 22.

[5]This list is by no means intended to be all inclusive. It is merely meant to give the reader an idea of the enormity and complexity of the United Nations system.

Organization and the four largest "specialized agencies": ILO, FAO, UNESCO and WHO. There are two reasons for this concentration. First, the regular budgets of the four main specialized agencies comprise approximately 85% of the all specialized agency budgets.[6] Secondly, of all the specialized agencies, the four largest agencies have made the most progress toward a working Planning, Programming and Budgeting (PPB) system.[7] This is not to say that the other agencies have not made progress in the field of PPB nor is it intended that the conclusions and/or recommendations of this thesis be applicable only to the four main specialized agencies. The other organizations could conceivably be affected by the findings contained herein.

With the various specialized agencies and their activities scattered throughout the world, the problems of program coordination become enormous. The myriad activities with which the United Nations system is concerned makes their common management a nearly impossible task. Another difficulty is that with so many activities there is bound to be some duplication and overlapping of effort. With the overlapping of programs into two or more organizations comes the possibility of a failure to cooperate among organizations and potential conceptual differences with regard to objectives. That is,

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[6]"Annual Report to Congress on U.S. Contributions to International Organizations," HR Doc. no. 93-195, (USGPO, Washington, D.C., 1973).

[7]"Report on Medium Term Planning in the United Nations System," Joint Inspection Unit Report No. 74/1, (Geneva, 1974) p. 2.

the same individual program might accomplish completely different objectives for different organizations. For instance, the use of insecticide on certain agricultural crops might increase production which would be considered a benefit by FAO. At the same time, the use of this particular insecticide might be a potential health hazard to the inhabitants of the affected area. This would be considered a dis-benefit by WHO, concerned as it is with promoting better health.

The management of individual functional programs presents very difficult problems. Because of overlapping responsibilities, one problem is that of sub-optimization.[8] This is chronic since the optimization of one particular program or level does not necessarily maximize the good to the entire system, whether from a member country's perspective or that of humanity. It is essential to be able to view the system as a whole and make decisions that will be optimal with respect to each element making up the total United Nations system.

The funds used to carry out the many programs are from multiple sources. Thus, an individual program is of interest to various members not only from the standpoint of administering it, but also of financing it.

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[8]Hitch, Charles, "Sub-optimization in Operations Problems," Operations Research, Vol. I, No. 3, May 1953, pp. 87-99.

It is necessary for organizations, both individually and collectively, to keep their programs under constant review in order to increase effectiveness. Some form of evaluation scheme is needed to insure that program objectives are being met. Objective analysis becomes a necessary tool with the increasing complexity of the various programs. On the other hand, analysis is more applicable with the advent of new informational and decisional technologies, such as computers.

If an organization were to be blessed with unlimited funds there would be less of a compulsion to seek good management, but this is not the case. Over the last several years we have witnessed a rapid expansion of programs in the economic and social fields along with a steady decline in the buying power of available program funds. Even though the amount of funds available for programs continues to grow, the needs of the developing countries in the economic and social areas are rising at an even sharper rate. It is also true that despite the high level of international economic and social funding, the gap between developed and developing countries continues to grow wider. With the widening economic gap comes the realization that the definition of the word "need" must expand. There are many "needs" today, especially in the health sector, which ten years ago would not have been deemed essential. As economic and social needs for the lesser developed countries expand, programs designed to alleviate those needs must expand. At the same

time, managers and decision-makers must be concerned lest uncontrolled expansion render less effective the increased efforts of the member states. Some programs will be pushed at the expense of others due primarily to differing national interests. This phenomenon occurs as an indirect result of multi-source funding in international organizations.[9] A rational allocation of the limited resources available is necessary in order to achieve maximum results. Again constant review of programs is essential to the fulfillment of their objectives.

B. THE PROGRAM BUDGET AS A RESPONSIVE TECHNOLOGY

A process for systematically relating expenditure of funds to a strategy for the accomplishment of planned objectives is called program budgeting. In the 1960's, the Planning, Programming and Budgeting System (PPBS) introduced in the United States Department of Defense afforded a way for planners and decision-makers to relate a myriad activities to their intended purposes and assign to each its associated costs.[10] In seeking a responsive technology for the problems of multiple program management, international organizations must examine and experiment with program

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[9] Everyman's United Nations, op. cit., p. 439.

[10] President Johnson announced that PPBS would be installed government-wide on 25 August 1965. This was followed by Bureau of the Budget bulletin number 66-3 dated 12 October 1965, the basic implementing document.

budgeting. A key element in PPBS is the "program structure," which links the long-range goals and nearer-term objectives that the policy-maker hopes to accomplish to the expenditures by which he proposes to achieve these ends. Programming is a technique for allocating scarce resources among competing needs. The resultant budget becomes thereby a statement of policy.

A second key element in PPBS is analysis. By such process, one attempts to provide the policy-maker with a comprehensive and orderly measure of the advantages and disadvantages of alternative means of accomplishing a given end, relying heavily on quantitative data. The main goal of PPBS is to rationalize policy-making by providing: (1) data on the benefits and costs of alternative means of attaining proposed objectives; and (2) output measures to facilitate judgment concerning the actual and planned results obtained with given resources. The virtues of the program budget are its usefulness in relating ends to means in a comprehensive fashion, the emphasis it puts on the policy implications of budgeting and the ease with which it permits consideration of the budget as a whole as each program competes with every other for available resources.[11]

The concepts underlying the informational cycle of PPBS are generally considered to be related to: (1) inputs

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[11]Schultze, Charles L., The Politics and Economics of Public Spending, (The Brookings Institution, Washington, D.C., 1968) pp. 37-42.

(resources) and their monetary costs; (2) outputs (end results, whether products or services); (3) effects (benefits or dis-benefits); and (4) alternatives.[12] These concepts provide the basis for both quantitative measurements and looser qualitative information. As parameters of system performance, they provide the basis for information on past and present performance as well as probable or desired future performance. They also happen to be the same concepts that underlie program appraisal techniques customarily used in modern business organizations and by the World Bank.[13] The aim of PPBS is to specify (and where possible, to quantify) the objectives, or output, of spending programs and then to minimize the cost of achieving these objectives.

Clearly, for international organizations, the Department of Defense model of PPBS installed under the aegis of Dr. Charles J. Hitch is helpful only in the most conceptual way.[14] Virtually all international organizational systems would need to develop their own peculiar models adapted to their own environment, subject matters and power structure.

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[12]Hovey, Harold A., The Planning-Programming-Budgeting Approach to Government Decision-Making, (Frederick A. Praeger, Inc., 1968) pp. 45-72.

[13]Gross, Bertram M., "The New Systems Budgeting," Public Administration Review, Vol. XXIX, March/April 1969, No. 2, p. 117.

[14]Senator Jackson Committee print, Planning-Programming-Budgeting, Interim Observations, (USGPO, Washington, D.C., 1968).

That is, in the application of PPBS to multilateral institutions, it is important to take careful account of the special circumstances and needs of different international organizational systems and their constituent agencies. In this respect, since its inception in the 1960's, PPBS has become more and more flexible. Always to remember about PPBS is that it is only a tool. It is not a panacea which will scientifically solve the world's problems. The analyses generated by the PPBS approach involve various assumptions and guesses of critical importance. The responsible policy-maker will certainly want to assess these assumptions and review the guesses himself.

The possibility of being unprepared for change is a real problem for the policy-maker in this age of expanding needs and limited resources. The risk increases as scientific and technological changes continue to occur more rapidly, as populations continue to grow and as the world's supply of certain resources threatens to become exhausted. In order to minimize the risk of being caught short, the policy-maker must be able to visualize future needs, identify important issues and be able to set in motion timely and appropriate courses of action. Both planners and policy-makers must be acutely aware of the changing missions and strategies of their organizations. The setting of each organization's priorities in terms of the foreseeable issues is now seen as a much more participative and inter-active process than

some conventional managers thought necessary. Those affected by policies as well as experts possess vital information for the policy-maker. Nearly everyone involved must prepare for contingencies which might require changes. Thus, the planning concept underlying PPBS is to render more visible and open to rational examination any large organization's many associated activities, their declared purposes and their related costs. Required are the input of accurate information, well-founded analysis and sensitive understanding of human aspirations in order to provide helpful aid and judgment to those making policy decisions and coping with change. Some sort of a program structure or strategic plan of who is to use what resources for what purposes is a necessity.

Another important concept underlying PPBS is that it is both desirable and possible to evaluate program effectiveness and efficiency. A systematic, comprehensive approach would be needed to evaluate programs in international organizations. The effectiveness of an individual program is the extent to which established objectives are attained as a result of the activity devoted to that program.[15] In evaluating the effectiveness of programs, specific measures of accomplishment for each sub-objective as well as program objectives are stated, following which data on their attainment are collected systematically.

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[15]Deniston, O. L., Rosenstock, I. M. Welsh, W. and Getting, V. A., "Evaluation of Program Effectiveness and Program Efficiency," Planning-Programming-Budgeting, edited by Lyden and Miller, (Markham Publishing Co., Chicago, 1972) p. 143.

Program efficiency is the cost in resources of attaining objectives.[16] The efficiency of a program may be unrelated to its effectiveness. A model in any program budgeting system should be able to answer at least two questions: (1) to what extent were objectives attained as a result of program activities (program effectiveness)? and (2) at what cost (program efficiency)?

In evaluating effectiveness, one must not only ask whether the program objectives were accomplished, but to what extent were their achievement the result of the activities of the program? The ratio of actual to planned achievements is often used in the analysis of program effectiveness. Such a ratio will be based on at least one of three variables: resources used, activities performed or objectives attained. The easiest of these ratios to discover is that comparing actual and planned use of resources. The most complicated ratio to find is that indicating the attainment of objectives. The reason for this complexity is that it is difficult to form a ratio that takes into account the effects on a program of activities and events outside it. Evaluation should assess the extent to which achievement of the objective can be attributed to activities performed in the program. For example, suppose the goal of a particular program was that 95% of a population be immune to a disease. Figures show

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[16]Wildavsky, Aaron, The Politics of the Budgetary Process, (Little, Brown and Co., Boston, 1964) pp. 142-143.

that 80% have actually become immune but that a quarter, 20%, became immune for reasons other than program activity. Program effectiveness would then be

$$\frac{80 - 20}{95 - 20} = \frac{60}{75} = 80\% \ .$$

One way to estimate the status of an objective's attainment is to compare one or more activities to a control group of similar character. In many social and economic programs, it is not feasible to use a control group. In these cases, it is often possible to formulate alternative explanations for the outcome of a program and determine from the available facts which of the alternative explanations is supported. The conclusion that program activities caused outcomes requires judgment and can never be made without some uncertainty. The use of control groups or the testing of various hypotheses are techniques that can reduce uncertainties.

If the attainment of certain objectives were considered desirable regardless of cost and if unlimited resources were available for the financing of international organizations, evaluation of program efficiency would not be necessary. It is obvious, however, that these conditions do not occur and that therefore program efficiency must be of concern to policy-makers.

One definition of efficiency that is applicable to international organizations is classical: the ratio of the

energy developed by a machine (output) to the energy supplied to it (input). This definition translates to a ratio of output (net attainment of program objectives) to input (program resources expended).

A decision choosing among alternative programs cannot be made rationally without knowledge of both program effectiveness and program efficiency. For example, suppose that two programs have the same objective. Program "A" attains 100% of the objective at a given cost and program "B" attains 50% of the objective at one-fourth of the given cost. Program "A" is only half as efficient as program "B," but twice as effective. Which program is better? A rational decision can only be made with knowledge of both the effectiveness and efficiency of each program.

Generally, it is necessary to make an assessment of quality as well as quantity in program evaluation. This qualitative measurement can oftentimes be extremely difficult to make. Program personnel must keep in mind that effectiveness and efficiency are influenced as much by quality as well as quantity of resources and activities.[17] It is often the case that policy-makers will develop their own systematic measures of quality of the various factors and thus will be better able to evaluate program performance.

In order to use effectively available tools for evaluating program performance, it is necessary that programs have the

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[17]Quade, E. S., "Systems Analysis Techniques for PPB," Planning-Programming-Budgeting, op. cit., p. 259.

following attributes: (1) the objectives are specified qualitatively as well as quantitatively and are fixed in time to particular geographic areas and target populations; (2) the programs are described in sufficient detail to permit reliable observations and comparison of performance of planned activity; and (3) all resources that are directed toward program activity have been clearly identified.[18] That is, the most important step toward meaningful effectiveness and efficiency evaluation is to be able to attain clarity about what a program is and what it contains.

An orderly and open analytic study designed to help a policy-maker identify a preferred course of action from among possible alternatives might be termed systems analysis.[19] It is characterized by a systematic and rational approach, with assumptions made explicit, objectives and criteria clearly defined and alternative courses of action compared in the light of their possible consequences. For many years systems analysis has been used in connection with weapon development and determination of strategic objectives.[20]

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[18]Levinson, Perry, "Goal-Model and System-Model Criteria," Planning-Programming-Budgeting, op. cit., pp. 286-295.

[19]Hoos, Ida R., Systems Analysis in Public Policy, (University of California Press, Berkeley, 1972) pp. 71-74.

[20]Hitch, Charles J. and McKean, Roland N., The Economics of Defense in the Nuclear Age, (Harvard University Press, 1960) pp. 105-118.

Since systems analysis represents an approach to any problem of choice under uncertainty, it should be able to assist with problems in the social and economic areas.

C. PROMULGATION OF THE IDEA

As a result of some of the aforementioned difficulties and opportunities, the United Nations General Assembly, at its twentieth session in the fall of 1965, drew up resolution 2049, which established an Ad Hoc Committee of Experts to Examine the Finances of the United Nations and the Specialized Agencies.[21] The responsibilities of the Committee were to:

> (1) Examine the entire range of budgetary problems of the United Nations system, notably the administrative and budgetary procedures, the means of comparing and, if possible, standardizing their budgets with a view toward avoiding needless expenditure, particularly that expenditure resulting from duplication; and
>
> (2) Make recommendations as appropriate to secure better utilization of the available funds through rationalization and better coordination of the activities of the organizations and to "ensure that any expansion of those activities takes into account both the needs they are intended to meet and the costs the member states will have to bear as a result."[22]

The Committee was composed of representatives from fourteen member states designated by the President of the General Assembly. The Committee held three main sessions, the first in New York from 2 February to 25 March 1966,

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[21]UN General Assembly Resolution 2049 (XX) dated 13 December 1965.

[22]Ibid.

the second in Geneva from 19 April to 6 May 1966 and the third in New York from 6 June to 19 July 1966.

At its first session the Committee concentrated its efforts on the financial situation of the United Nations system. The Committee met with high ranking officials of several of the specialized agencies, as well as the United Nations, including the four main specialized agencies: FAO, UNESCO, WHO and ILO.

Early in the second session, the Committee developed a list of major points upon which it might focus attention. Three of these were:

(1) possibility of standardization of budget preparation and methods for facilitating comparison;

(2) possibility of improvements in methods and techniques of preparation of programs and the avoidance of duplication; and

(3) possibility for each specialized agency to develop its long-term planning geared to agreed objectives, taking into account the availability of resources as well as the needs of the developing countries.

This session again was highlighted by meetings with representatives of the various specialized agencies.

The third session was devoted primarily to an examination of the budgetary and financial problems of the United Nations. Present at various times were the United Nations Comptroller and his staff in order to provide information to the Committee on aspects of the United Nations budget.

What had to be done was to indicate clearly:

(1) how better planning and programming methods would be conducive to better chosen priorities and to objectives more precise and easier to evaluate; and

(2) how, on the occasion of this appraisal, the purpose and general conception of the activity of the international organizations in the economic and social spheres can be defined more clearly.

In the next section, the writer will examine the contributions of the Ad Hoc Committee and the efforts by the United Nations and the four main specialized agencies in the area of program budgeting.

III. ACTUAL PROGRAM BUDGETING IN THE UNITED NATIONS SYSTEM

A. EFFORTS BY THE AD HOC COMMITTEE

As the scope and intensity of international economic and social cooperation and joint action by states and their international organizations have increased, governments and their international administrations have become more and more anxious to narrow the gap between what is needed and what is available in terms of resources. Because of their multi-governmental constituency and parliamentary character, international organizations are forever striving for better methods in planning and programming, a clearer definition of objectives, a more efficient method of selecting priorities and a more meaningful model for evaluating the results achieved.

In 1965, as a result of the financial crisis caused by intentional arrearages of several members and the unpaid extraordinary debts for the UN's peacekeeping operations in the Near East and the Congo, the UN General Assembly created the Ad Hoc Committee of Experts to examine the financial practices of the United Nations and the Specialized Agencies.[1]

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[1]UN General Assembly resolution 2049 (XX), 13 December 1965, paragraphs 6 and 7.

The Committee concentrated its efforts on what it considered to be the basic measures necessary for greater efficiency and purchasing power of money in the vital fields of social and economic development. Specifically, the Committee looked at overall efficiency, the elimination of possible duplication and overlapping of effort, improved methods in budget preparation and presentation, inspection, control and better administration, long-term planning and evaluation and the best utilization of available resources, both human and material.

1. Budget Preparation, Presentation and Performance

In the course of its inquiries, the Committee found that in a number of cases the budgetary methods and procedures could be made more effective. The tightening up of budgetary methods could be accomplished without sacrificing flexibility. Standardizing the documentation of the budgets used in the various organizations in the United Nations system was considered desirable, but was acknowledged as presenting problems because of dissimilarities in the functions and forms of the different bodies.[2] It was decided that further study of the extent to which standardization was feasible was necessary. On the other hand, it was felt that certain measures should be applicable immediately in order to introduce several common principles into budgets.

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[2]UN Document A/6343, "Second Report of the Ad Hoc Committee of Experts to Examine the Finances of the United Nations and the Specialized Agencies," 19 July 1966, paragraph 20.

These common principles are greater clarity, control and coordination. The applications of these principles were hopefully to provide essential data such as the breakdown of expenditures into various cost categories (administrative, operational, research and general).

One general recommendation[3] of the Ad Hoc Committee came in the area of budget preparation. It was felt that insufficient emphasis was given to that period in the budgetary cycle which called for budget review prior to the time of formal adoption by the appropriate legislative bodies. As much as a year ahead of time, it was agreed, preliminary and approximate estimates should be made available to the examining bodies. This is so that the main items of the budget could be considered well in advance. It was also felt that in each organization a competent financial committee should make a report on the budget estimates and present it to the member states in adequate time before formal adoption.

In the area of budget documentation, it was necessary to do more work on possible standardization. A certain amount of supplementary information was considered a necessity for the purpose of imparting greater clarity to the existing documents. The organizations using traditional budgetary breakdown by object of expenditure should also submit a breakdown by main fields of activity. On the other

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[3]In many instances which follow, one or more organizations already followed the recommendations either as made or in slightly modified form.

hand, those organizations using the functional budgetary method of breakdown should submit, in addition, a breakdown by object of expenditure. Each organization should incorporate a foreword and various annexes with its budget. The foreword should aim at showing the scope and purpose of activities to be undertaken during the budget period under consideration, including objectives, total expenditure by main field of activity and comments on the reasons for proposed changes and resultant expenditures. The annexes should include, but not be limited to:[4]

(a) A descriptive list of main programs covered by the budget;

(b) A geographical annex classifying programs by the countries or areas in which they are carried out; and

(c) An organizational chart for the budget period under consideration.

Proposed increases should be explained clearly as to what extent they are due to expansion of programs, staff, activities or just increases in prices.

Several recommendations were made under the subheading "Budget practices and performance." For the most part, these recommendations were made with a view toward greater control over the resources available to the organizations. Supplementary expenses should be explained

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[4]One such annex should contain a breakdown of expenditures into administrative costs, operational costs and general research costs.

in detail as should the financing procedure used to meet them.[5]

As to budget cycle, the Ad Hoc Committee recommended that all specialized agencies having an annual budget should adopt a biennial cycle. As far as the United Nations itself was concerned there were differing opinions. One faction was of the opinion that a biennial cycle would save time and reduce the workload on the part of the United Nations Secretariat. Another advantage was felt to be the potential for greater coordination and programming with the whole United Nations system on a common budget cycle. On the other side, a two-year cycle might adversely affect the flexibility of the United Nations in the political, economic and social fields.[6] It was therefore recommended that the Secretary-General be asked to make a detailed study of the advantages and disadvantages of a biennial cycle. This study together with the comments of the Advisory Committee on Administrative and Budgetary Questions (ACABQ) thereon, should be submitted for consideration to the twenty-second session of the United Nations General Assembly.[7]

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[5]There are various procedures used, two of these being: transfers from savings in other sectors and drawing on the Working Capital Fund.

[6]The thinking being that once locked into a two-year budget, it would be difficult to make changes thereto.

[7]As noted later in this section, all examined organizations are now using a two-year budgetary cycle.

It was highly recommended by the Ad Hoc Committee that a standard nomenclature of budgetary and financial terms be adopted and followed throughout the United Nations system. The following are some examples of nonstandardization in terminology:

> "Sections, chapters, parts: These terms denoting divisions of a budget have different meanings from organization to organization.
>
> "Programme: Some organizations use the term to mean all the operational activities included in their regular budget. One agency applies the term 'major programme' to all of its activities without distinction. Another agency calls the whole of its regular budget the 'regular programme.'"[8]

This confusing terminology is not only a source of puzzlement to member states but it makes comparison of budgets and financial statements quite difficult.

2. Program Planning and Evaluation

The Ad Hoc Committee considered most vital the area of program planning and evaluation in the pursuit of its primary goal better utilization of funds available to the United Nations system. The following is a quotation from the Committee's second report:

> "Further development and application by the United Nations family of organizations of an integrated system of long-term planning on a programmed basis is an essential ingredient in improving their programming and budgetary processes and ensuring throughout the United Nations system the most rational use of available resources. While most of the agencies are giving increasing attention to planning and programme formulation, there are considerable differences in their

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[8]UN document A/6343, "Second Report...," op. cit.

approaches--most notable is the fact that planning, programming, and budgeting are not more systematically integrated even after allowing for a necessary degree of independence from each other."[9]

With the rapidly expanding activities of the United Nations system and the fact that the main constraint to these increased activities is resources available, comes the realization that it is essential that the best use should be made of these limited resources. Advance planning and proper coordination are invaluable aids in accomplishing this goal. It is very important that the member states have in advance a clearer idea of what resources will be needed and for what purposes.

As stated in section II , a significant problem with multi-source funding of international organizations is that there often exist as many ideas about how the funds should be allocated as there are sources. Long-term planning will go a long way in facilitating not only coordination between various international organizations but also between the organizations and the donor and recipient countries. Long-term planning will also make comparison of future activities by organizations easier thereby resulting in less duplication of effort and closer adherence to the goal of maximization of the good to the entire system.

With these points in mind, the Ad Hoc Committee made several recommendations designed to emphasize the importance

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[9]Ibid.

of the planning process. It was recommended to each of the organizations in the United Nations system that immediate steps be taken to develop and utilize an integrated system of long-term planning, program formulation and budget preparation. Objectives for the planning period, priorities for these objectives and courses of action for carrying out these objectives would be contained in each organization's proposed plan. Because needs are not stationary, but rather ever-changing, the list of priorities would, by necessity, have to be reviewed and kept up to date constantly. Likewise, alternative courses of action would have to be considered as availability of funds fluctuates. It was also recommended that each organization synchronize its planning and budget cycle with those other organizations having the same budget cycle.

The significance of evaluation was being recognized by many of the organizations in the United Nations system; however, it was felt that improvements could be made in this area. Defined by the Ad Hoc Committee:

> "Overall evaluation consists in estimating the scope, cost and potential effectiveness of a project or programme before a decision is taken on it, checking the estimates and performance during its execution, and determining the cost and the results achieved when the project or programme is finally completed."[10]

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[10]Ibid.

The Ad Hoc Committee recommended that each organization initiate efforts to improve the overall evaluation process using standards, criteria and techniques of evaluation common to the United Nations system. The United Nations Institute for Training and Research (UNITAR) could be of invaluable assistance in developing these common procedures.[11] Periodic progress reports, with evaluation data, on continuing programs should be provided to the governing bodies of the various organizations. This would assist these governing bodies in making decisions concerning current activities by giving these bodies the benefit of past data and experience. Of course, effective evaluation of on-going and completed programs aids in choosing the best courses of action in the future.

Article 63 of the United Nations Charter states in part:

> "The Economic and Social Council...may coordinate the activities of the specialized agencies through consultation with, and recommendations to, such agencies and through recommendations to the General Assembly and to the members of the United Nations."[12]

In view of this provision in the Charter, one might expect that the major roles in examining plans, programs and progress of the agencies and incidentally in coordinating their activities would be played by the Economic and Social

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[11]Article 1 of the United Nations Charter specifies the responsibilities and purposes of the UN in this area.

[12]Everyman's United Nations, op. cit., p. 551.

Council and the UN General Assembly.[13] It was felt by the Committee, however, that techniques being used could be improved.

The adoption by the agencies of the biennial budget cycle and longer-range programming would be important steps toward more effective coordination. Some of the recommendations made by the Committee follow:

> (1) Budget reviews should be performed in such a way as to enable the agencies to take into account the recommendations of the Economic and Social Council and the UN General Assembly prior to formal adoption of the budget;
>
> (2) The Advisory Committee on Administrative and Budgetary Questions should conduct periodic and systematic reviews of the administrative and management procedures concerning the programs and budgets of the specialized agencies; and
>
> (3) A concept known as the Special Committee on Coordination should be reconstituted within the Economic and Social Council in an attempt to more effectively carry out the responsibilities for the coordination as delineated in the United Nations Charter.

Along with these recommendations, it was felt by the Committee that effective coordination could be achieved through better coordination within member governments of their own efforts and their own representatives to the various organizations.

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[13]Articles 57, 58, 62, 63 and 64 of the United Nations Charter contain the provisions with respect to the role of the Economic and Social Council (ECOSOC) in relation to the agencies. Although the General Assembly has overall responsibility, it is the ECOSOC which is more directly concerned with the agencies.

B. FOLLOW-ON EFFORTS BY THE INTERNATIONAL ORGANIZATIONS

With respect to program budgets and biennial budget cycles, the recommendations made by the Ad Hoc Committee did not apply to all members of the United Nations system. In terms of the organizations examined in this discussion, all but the United Nations and ILO had adopted both program budgeting and biennial cycles by the middle 1960's. Actually, the first program budgets (joint presentation of programs and budget) date from as far back as 1948, when WHO opted for this method.

In terms of longer-range planning, however, progress has only come much more recently. With the exception of WHO, which began to present "programs of work for a specific period"--actually five years--as early as 1952, longer-range planning began to appear only from the early 1970's. At the present time, outlines of medium-term plans already exist in the five organizations.[14] The form of these plans varies according to the organizations concerned. Lastly, several of the organizations are following the lead of the United Nations Development Programme (UNDP), which adopted a "country programming" system in 1970 (for the period 1972-1976). WHO refers to country programs in its 1975 budget. FAO and UNESCO have undertaken a number of country studies which may also serve as the basis for a programming system. Table I, attached, gives more precise

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[14]This can be seen in the most recent documentation of the various organizations.

TABLE I

Main Dates of the Adoption and Execution of Various Measures Leading to a Programming System

Adoption of a program budget

WHO - from its inception
- 1972 (modification for the financial year 1975)

UNESCO - 1951 for the financial period 1953-1954

FAO - 1952 for the financial year 1953
-1969 (modification for the financial period 1972-1973)

ILO - 1966 for the financial year 1967

UN - 1972 for the financial period 1974-1975

Adoption of a biennial budget cycle

UNESCO - 1951 for the financial period 1953-1954

FAO - 1957 for the financial period 1958-1959

ILO - 1968 for the financial period 1970-1971

UN - 1972 for the financial period 1974-1975

WHO - 1973 for the financial period 1976-1977

Adoption of a medium-term plan

WHO - 1952 program of work for a specific period (five years)

UNESCO - 1968 for the period 1971-1976 (six years)
- 1970 second plan, for the period 1973-1978 (six years)

FAO - 1969 for the period 1972-1977 (six years)

ILO - 1970 for the period 1972-1977 (six years)
- 1972 second plan, for the period 1974-1979 (six years)

UN - 1972 for the period 1974-1977 (four years)

WHO - 1972 new formula to begin in 1976

Adoption of country planning

WHO - 1973 first country programs in the program budget for 1975

FAO/UNESCO - 1971-1973 first country studies

details on the stages of adoption of a programming and planning system in the United Nations and the four specialized agencies.[15] It is interesting to note that much of the progress has been made since 1966, encouraged considerably by the recommendations of the Ad Hoc Committee. There are two other studies which have contributed greatly to the progress demonstrated by the five organizations. One is the Study of the Capacity of the United Nations Development System published in 1969 and the other is a report of the Joint Inspection Unit on "Programming and Budgets in the United Nations Family of Organizations," published 3 December 1969.

Any serious discussion of the improvements in methods must be preceded by a description of some of the elements of contemporary problems in the area of programming and budgeting. Each of the five international organizations considers it has unique responsibilities and thus a particular order of priorities as these relate to the economic and social field.

The field of public health is one in which governments have little trouble finding a basis for agreement. Because of this and the fact that, as a general rule, relief is more easily motivated for the diseased than for the poor or illiterate, WHO seems to have realized the importance of

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[15] "Report on Medium-Term Planning in the United Nations System," op. cit.

its program at an early stage. A strong geographical framework has made it easier for WHO to identify the needs of its member governments and thus formulate its program.

On the other hand, it is much more difficult to get agreement in matters concerning education, science, labor, industry or agriculture. Hence, it is not quite as simple for UNESCO, FAO and ILO to define the types of problems they should be attacking. UNESCO regards itself as a research institute with a very general formulation of its program. ILO's regular program seeks to maintain an equality between, on the one hand, activities aimed at strengthening economic development (human resources and employment) and, on the other, legal, institutional, regulatory and social activities. However, extra-budgetary funds (technical cooperation with developing countries financed by UNDP, for example) are almost exclusively concentrated in the former category (see Table II[16]). This indicates that ILO is much more concerned with problems in the economic development and employment fields. However, this fact is not readily apparent without taking account of activities financed through extra-budgetary funds. This indicates a problem with a budgetary presentation which does not properly describe activities financed from outside the regular budget. PPBS requires that all inputs be shown.[17]

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[16] Ibid.

[17] Weidenbaum, J. L., Larkins, D. and Marcus, P. N., Matching Needs and Resources, (American Enterprise Institute for Public Policy Research, Washington, D. C., 1973).

TABLE II

Main Programs and Annual Expenditures for ILO
(1974/75 program & budget)

Programs	$ Million			% of
	Regular Program	Extra-Budgetary Funds	Total	Overall Total
1. Human resources development	2.2	31.8	34.0	57.9
2. Social institutions development	2.6	5.0	7.6	12.9
3. Employment planning and promotion	1.3	5.4	6.7	11.4
4. Conditions of work and life	2.7	1.7	4.4	7.5
5. Central research and planning	2.7	.4	3.1	5.2
6. Industrial activities	1.3	.25	1.55	2.6
7. International labor standards	1.5	.0	1.5	2.5
TOTAL	14.3	44.55	58.85	100.0

In the case of FAO, the volume of activity financed by extra-budgetary funds far exceeds the amount of the regular budget.[18] Here again, we have the problem of regular budget activities being only a small fraction of total activities.

The economic and social activities of the United Nations itself are highly complicated in form. The activities are carried out by various bodies: the Department of Economic and Social Affairs, the four regional economic commissions[19] and the secretariats of the United Nations Conference on Trade and Development (UNCTAD) and the United Nations Industrial Development Organization (UNICO). There is still a tremendous problem of non-cooperation among these units, thus making the coordination of all the economic and social activities in the UN system an extremely difficult problem.

The total amount of funds available to programmable economic and social activities within each organization is shown in Table III.[20]

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[18]FAO receives about one-third of all UNDP funds available to organizations for technical cooperation.

[19]Economic Commission for Africa (ECA), Economic Commission for Asia and the Far East (ECAFE), Economic Commission for Europe (ECE) and Economic Commission for Latin America (ECLA).

[20]"Report on Medium-Term Planning in the United Nations System," op. cit., adapted from table page 76.

TABLE III

Organization	$ Million Annual Regular Program	$ Million Annual Extra-budgetary Funds	Total
WHO	83.1	73.9	157.0
ILO	30.0*	44.55	74.55
UNESCO	36.0	50.0	86.0
FAO	18.8	108.9	127.7
UN	72.7	137.4	210.1
TOTAL	240.6	414.75	655.35

*This figure includes costs of management of field programs (about $7.7 million), conference services and publications (about $8.0 million) and direct expenditure on major programs (from Table II, about $14.3 million).

Since technical cooperation activities absorb 100% of the extra-budgetary funding, plus a large portion of the funds allocated to regular program activities, it is possible to categorize the organizations in terms of either technical cooperation or study and research orientation. WHO, FAO and UNIDO are mainly oriented toward programs of technical cooperation with the developing countries, while UNCTAD and the regional economic commissions of the UN are essentially study and research organizations. In the middle lie ILO, UNESCO and the UN Department of Economic and Social Affairs which strive to maintain a balance between the operational activities of technical cooperation and the promotion of ideas or standards through varied research programs.

With the tremendous scope and multiplicity of tasks accepted by the international organizations comes the concern that their programs will expand beyond their means. This concern motivates the demand for programming and that priorities be set for major programs. The general adoption of programming can make sense, however, only if it promotes the harmonization of methods among organizations and paves the way for the integration of their programs. With all the knowledge that the individual international organizations have gained about program budgeting systems and longer-range planning, their experience has largely been confined to their respective internal operations. They have not had the opportunity to compare efforts or results.

It is important, indeed necessary, the writer feels, to provide a comparative study of the documentation and methods now in use by the examined international organizations.

IV. INITIAL FINDINGS

A. GENERAL LACK OF CLARITY

The desired standardization of budgetary presentations in the organizations belonging to the United Nations system presents neither a purely formal problem nor a merely technical one. It requires introducing clarity into two areas where confusion presently prevails. One of these areas is the financial system, where it is difficult to determine of what receipts and expenditures actually consist and to which activities they are devoted. The other area is the programming system, where questions persist as to what precise results are sought and how they are obtained.

In order to introduce more clarity into this complex institutional environment, the respective organizations must exactly define what their activities consist of, and provide member states with a clear and exhaustive description of the reasons why they are asked to contribute financial assistance to these activities.[1]

This necessary clarification ought to be achieved through the budget document. The budget should not only be a document authorizing receipts and expenditures but

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[1]With a better understanding of why they contribute, hopefully member states will contribute more for economic and social development.

also a statement providing information on the life of an agency in all its aspects. This information must be useful not only to the international secretariats and national legislative experts, who are either familiar with the substantive work or knowledgeable about budgetary machinery and practice; the presentations must also inform national opinion-makers, representatives and decision-makers with little or no knowledge of the problems of a particular international agency. In instances where activities are not financed totally from member states assessed contributions (that is, are financed by multilateral sources, such as the UNDP, or by loans from agencies like the World Bank), the budget document ought to reveal the make-up cost breakdown of these multilateral financed activities, using figures and graphical techniques where applicable.[2] Without this description, a full and true account of the program is not being provided.

The programming systems of the various agencies must be improved also. There exists a void between what should be done on a world scale (e.g., the Second Development Decade) and what is being done on a day-to-day basis (through actual program implementation). The development of a common programming language would facilitate the processes of integration and coordination which must occur if priorities

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[2]Graphical techniques such as bar or pie graphs have shown applicability in areas such as this.

are to be observed and greater efficiency is to be achieved. At the same time, the role of the world-wide system of international agencies in the field of economic and social development should be better defined.

Examples of incongruities in the financial and programming systems of the examined organizations are shown in the attached Appendix I, exhibits A through E, as excerpts from recent budgetary and program documentation.

It is virtually impossible to obtain a forward look at a complete financial plan for all the income and expenditure of the United Nations family. This difficulty stems not only from the variety of forms in which financial documents are presented, but also from the fact that approximately one-half the funds used were neither forecast nor authorized in advance for a particular financial period. These un-budgeted funds are provided extraordinarily at various times during the course of a budgetary cycle.[3] This provision applies primarily to funds given the different agencies for the purpose of technical cooperation through the UNDP. This practice frustrates the drawing up of a coherent general picture of the actions to be undertaken and, therefore, considerably hampers rational programming.

A clearer picture of the activities of the United Nations family as a whole could be obtained by showing,

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[3]The former problem being a direct result of the latter.

even in summary form, the allocation, by the organizations to certain major continuing activities or main projects, of all funds to be used.

The present lack of financial clarity can be traced to the fact that a precise definition of the objectives to be pursued is not readily evident.[4] The general objectives of the organizations within the United Nations family are well known. However, the distinction between policy "goals," such as the maintenance of international peace, economic and social cooperation or institutional development, and more specific, time-phased and, when possible, quantified "objectives" is not habitually made. Examples of the latter may be found in projects devoted to specific increases in agricultural production or the achievement of certain technological skills. Moreover, the funds allocated to the above-mentioned policy "goals" are usually unaccompanied by any specification of the "objectives," the achievement of which can be measured.

The achievement of a common language among the various international organizations with respect to standardized techniques for program and budget representation would serve several very useful purposes, two of which are:

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[4] In particular, the specific objectives of the various organizations with regard to development do not stand out with sufficient clarity.

(1) the improvement of the technical operation of the various agencies, making it easier to evaluate the results of their programs; and

(2) better informed international and national public opinion as to the objectives pursued and the quality of results obtained, which could aid in increasing resources allocated by the member states to finance UN family activities.

In terms of programming methods, attempts should be made to orient the efforts of the UN and its various agencies into what might resemble a world economic and social plan of action. What appears to be necessary is the reconciliation of agency efforts within each developing country with planning on a world-wide scale. A system must be devised whereby the alignment of overall theoretical thinking and actual implementation of programs in the field is possible. It is unrealistic to think that an institutional structure as complex and, in many respects, refined as the UN system can go on indefinitely without a comprehensive global plan.

Efforts are now being made toward the development of a suitable approach to integrated and comprehensive planning and control of UN and others' activities in the field of economic and social development. In pursuit of a comprehensive approach for formulating policies and programs of assistance, the Development Assistance Committee of the Organization for Economic Cooperation and Development (OECD) of the United Nations, has sought and examined some of the most advanced methods available.

The Committee is exploring to what extent these methods apply in providing a display of options for assistance policies as well as a more sophisticated and useful set of techniques for their evaluation.[5]

Toward a similar end, the World Bank Group has formulated a development plan, in terms of overall priorities of the UN system, for each developing country, in order to estimate what the World Bank Group could invest over a five-year period if there did not exist financial constraints.[6] This would suggest that the WBG recognizes that international organizations within the UN system now must deal with related aspects of common problems.

In the search for an integrated program structure that would aggregate the activities of the individual organizations in the light of joint policy objectives, Béat Alexander Jenny of UNITAR has done extensive work in formulating an "integrated planning and evaluation function for the UN."[7] Others had suggested a planning approach

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[5]"Development Assistance-Efforts and Policies of the Member States of the Development Assistance Committee-Review 1968," Paris:OECD, December, 1968.

[6]From the text of a speech by Robert S. McNamara, President of the World Bank, at the annual meeting 30 September 1968.

[7]From a paper presented at the Symposium on International Program Budgeting and Economic Development, York University, Toronto, Canada, 24-26 May 1969.

based upon isolating certain key objectives and deriving secondary objectives from them (the target-setting approach), but that encounters serious limitations, among others, the possibility of agency and smaller unit suboptimization. Jenny proposed a formal systems-theoretic approach to economic and social development problem-solving as an alternative. The benefits of employing a systems-oriented method of analysis became evident in terms of improving substantive coordination and feed-back relationships.

Another positive effort aimed at expanding the capacity of the UN system to support the development of member countries in the economic and social sphere came from Sir Robert Jackson, in his capacity as Commissioner in Charge, Survey of UN Development System. Jackson's Study of the Capacity of the United Nations Development System, (Geneva, 1969), proposed a program structure designed to make better use of resources, concentrating on the following factors:

(1) greater variety in the content of the program;

(2) closer relationship with the needs of individual countries;

(3) closer relationship with other forms of external cooperation, both within and without the system; and

(4) any necessary administrative, managerial and organizational innovations needed to achieve those ends.

To date little has been done toward the implementation of Jackson's proposals as evidenced by the lack of attention

given to the "Capacity Study" in subsequent Reports of the Secretary General on the Work of the Organization.[8]

B. NEED FOR THE IDENTIFICATION OF AREAS OF CONCERN AND THEIR RELATED PRIORITIES

Program coordination, in order to be meaningful and contributive to a better allocation of effort and funds, demands coherence and clarity of purpose, funding and scheduling. Except for the general heading of health-related problems, where broad agreement seems to have been attained (thus enabling WHO to establish its objectives and priorities without excessive difficulty), the coordination of program activities by general categories has been difficult to realize.[9] For example, the problem of how responsibilities with respect to agricultural education should be divided among the three organizations concerned--FAO, UNESCO and, to a lesser extent, ILO--was nearly insurmountable. It was eventually settled through the inter-agency Administrative Committee on Coordination (ACC), but only on a complementary basis with the setting up of a joint advisory committee on policy.

Another dispute which has menaced the UN family has been that concerning certain aspects of the development

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[8] In particular, see UNGA Official Records, Twenty-Sixth Session, Supplement No. 1 (A/8401) and Twenty-Seventh Session, Supplement No. 1((A/8701).

[9] Specifically, relating to education, science, labor, industrial and agricultural development.

and utilization of water resources. The United Nations, with its broad responsibilities for development, has felt that the UN itself should have the primary role in advising governments on general water policy and on water management administration and law. The agencies, on the other hand, tend to reply that most water projects serve much broader purposes, such as agricultural development, environmental conservation, health or industrial development. Therefore, they say, the administration of water projects would better be carried out by organizations with more expertise in these specialized fields.[10]

The search for priorities, that is how best and in which order to use the limited resources available, is another aspect of program coordination which has long claimed attention and eluded specification. The adoption of a single order of priorities among a number of problems indicates a greater exercise of thought and intelligence as well as management responsibility than the recognition and proclamation of the problem's existence.

Maurice Bertrand of the Joint Inspection Unit in its "Report on Medium-Term Planning in the United Nations System," emphasizes the importance of priorities, saying:

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[10]This controversy has been taken in hand by the UN Committee on Natural Resources which has preferred to look into individual cases rather than make sweeping decisions of principle.

"Within the bounds of inevitably limited appropriations, a classification [of priorities] presupposes choices which can, not to say must, lead to:

> "(1) the elimination of problems regarded as insufficiently important or incapable of yielding precise results; and
>
> "(2) the preferential distribution of available funds for dealing with certain problems at the expense of others; the percentage distribution of the funds of a particular budget among various types of activity is the clearest reflection of a certain order of priorities; in other words once the problems have been identified, it is a matter of selecting those which are considered to be deserving of action and to say how the available or mobilizable resources will be distributed among them."[11]

The governing bodies of the various organizations are most competent to make the initial choice from among specific proposals for medium-term, intermediate-state objectives within areas of concern of each organization. This initial choice must be made in the light of the total amount of the appropriations foreseen and again when available funds are actually known to an individual organization.

A procedure for program choice ought to be developed in such a way as to relate systematically specific program choices to an individual organization's interest in a particular geographical area. The procedure should facilitate an evaluation of each major input to each program recommendation on the basis of the relative efficiency obtained in achieving the agreed objectives.

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[11] "Report on Medium-Term Planning in the United Nations System," op. cit., pp. 84-85.

In order to avoid duplication of effort in the selection of programs and the setting of priorities, it is essential that inter-agency coordination be strengthened. In this regard, the ACC will have to take the lead in identifying common UN system objectives pertinent to several programs, promoting agreement concerning program priorities and ensuring the systematic exchange of useful planning information.

The analysis of program choices may take many forms. The traditional Bayesian decision theory is one possibility. Unfortunately, formal decision theory requires estimation of the probability distributions of uncertain variables, of which there are many in the economic and social sphere. This estimation would add an order of magnitude of computational complexity to the model. In addition, a formal treatment of uncertainty in this manner would suggest a capability for precision which does not exist.

A systematic approach using an additive value function and sensitivity analysis in dealing with uncertainty will be examined in Section V.[12] When problems, objectives and priorities are better defined, a program budget will prove to be both the process and the result.

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[12]An approach similar to this was shown with regard to policy analysis within the Department of State by R. M. Nutwell in his M.S. Thesis at the Naval Postgraduate School, Monterey, Ca. 1972.

The determination of work programs for the various organizations by their respective governing bodies and their coordinating mechanisms is an impossible task as practices now stand. The budgets adopted by these governing bodies apply only to the regular program and do not address the expenditure of extra-budgetary funds financed by means other than assessed contributions upon the organization's member states. Efforts to establish a reasonable methodology of planning thus come up against the fundamental difficulty created by the existence of separate decision-making processes for the regular programs and for those programs financed with extra-budgetary funds. There now exist two distinct systems of programming: medium-term programming for the regular programs, and country programming for programs based on extra-budgetary funds.[13] The need for a complementary system of decision-making is evident. It is essential in order to establish complementarity between the decisions and recommendations of the governing bodies of the organizations, on the one hand, and the recommendations of regional committees and decisions at the world level, on the other hand. An information system capable of providing the governing bodies with all such essential data must be established.[14]

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[13]Adoption of country programming has been accomplished, at least in part, by the four main specialized agencies.

[14]Computer systems have been used extensively for the purpose of aiding the information-getting process because of their ability to compile, arrange and store data of all types.

In the next section, the writer looks into areas of potential improvement in each of the examined organizations, giving particular attention to the better utilization of analytical techniques and the development of mechanisms that may assist program and budgetary evaluation. The concomitant information system is also the subject of the next section.

APPENDIX I

Actual program and budgetary presentation taken from recent UN system documentation. The excerpts are shown as follows:

Exhibit	Organization and document
A.	UN, Proposed Programme Budget for the Biennium 1974-1975.
B.	FAO, Programme of Work and Budget for 1974-75.
C.	ILO, Draft Programme and Budget 1974-75 and Other Financial Questions (Report II).
D.	UNESCO, Draft Programme and Budget for 1975-1976.
E.	WHO, Proposed Programme and Budget Estimates for the Financial Year 1 January-31 December 1973.

TABLE 7-7. ESTABLISHED POSTS: SUMMARY BY LEVEL AND BY SOURCE OF FUNDS

PROGRAMME: DEVELOPMENT PLANNING, PROJECTIONS AND POLICIES

Category	Source of funds: Regular budget 1972[a,b] Authorized	Regular budget 1973[b] Authorized	Regular budget 1974 Estimate	Regular budget 1975 Estimate	Other extra-budgetary resources 1972[a] Authorized	Other extra-budgetary resources 1973 Authorized	Other extra-budgetary resources 1974 Estimate	Other extra-budgetary resources 1975 Estimate
Professional and above								
Under-Secretary-General	—	—	—	—	—	—	—	—
Assistant-Secretary-General	—	—	1	1	—	—	—	—
Director (D-2)	2	1	1	1	—	—	—	—
Principal Officer (D-1)	5	6	7	7	1	3	4	6
Senior Officer (P-5)	9	9	10	11	10	12	13	14
First Officer (P-4)	20	23	24	25	2	3	3	4
Second Officer (P-3)	16	16	16	18	4	4	5	5
Associate/Junior Officer (P-2/1)	5	5	5	5	3	3	3	3
	57	60	64	68	20	25	28	32
General Service								
Principal level (G-5)	6	6	6	7	4	6	7	7
Other (G-4/1)	35	35	39	40	3	4	4	5
	41	41	45	47	7	10	11	12
TOTAL	98	101	109	115	27	35	39	44

[a] The 1972 authorized posts have been adjusted to reflect the transfer of one P-3 and one G-4/1 General Service posts from the regular budget to UNDP overheads shown as other extra-budgetary resources.

[b] The 1972 and 1973 authorized posts have been adjusted to reflect the transfer of 12 posts (1 P-5, 2 P-4, 4 P-3, 2 P-2/1 and 3 G-4/1) from Social Development and Humanitarian Affairs for work on social planning.

Public finance and financial institutions

7.36 The Public Finance and Financial Institutions programme is aimed at mobilizing domestic resources of developing countries, assisting in the best use of tax policy to promote international trade and investment, maximizing financial, technological and managerial contributions from operational enterprises in developing countries and modernizing systems of budgeting and financial management.

7.37 The objectives of this programme are:

— To develop budgetary techniques and methods for use as instruments in economic and social planning;

— To develop guidelines for international tax treaties, tax policy and administration and tax reform planning;

— To promote the mobilization of private savings in developing countries;

— To assist developing countries in the selection of forms of foreign investment and enterprise-to-enterprise operative technology which would yield the highest net social and economic return to the host country;

— To assist in the implementation of the principles and recommendations enunciated by the General Assembly and the Economic and Social Council regarding the right of States to exercise permanent sovereignty over natural resources.

7.38 The legislative basis for this programme is contained in:

— General Assembly resolutions 2626 (XXV), 2692 (XXV), 3016 (XXVII);

— Economic and Social Council resolutions 67 (V), 226 (IX), 1273 (XLIII), 1430 (XLVI), 1629 (LI), 1631 (LI), 1632 (LI), 1633 (LI).

7.39 The resources requested for this programme are those necessary to maintain the establishment in 1974/1975 at the levels approved for 1973. There are no new posts or reclassifications being requested for the 1974/1975 biennium for this programme. However, in 1974 one General Service post used for an administrative assistant will be transferred to the departmental administrative services in order to provide for central control and supervision of administrative functions.

Government budget and financial management

7.40 This programme component is designed to promote efficiency in the public sector both in plan formulation and in its implementation and to assist Governments, particularly of developing countries, in the modernization of their budgetary systems and of systems of financial management.

7.41 The objectives of this component are:

— To develop techniques and methods for efficient formulation and implementation of the government budget and for a review and appraisal of budgetary reforms;

— To improve financial management in the public sector through reforms in the accounting and auditing methods and practices;

— To improve financial management and financial performance of public enterprises; and

— To provide substantive support for technical co-operation activities.

7.42 The legislative basis for this component is contained in Economic and Social Council resolutions 1360 (XLV) and 1633 (LI).

7.43 As stressed by the International Development Strategy, the government budget is one of the most important instruments of plan implementation; greater emphasis should therefore be placed on improved budgetary systems and financial management in the public sector.

Domestic taxation

7.44 This programme component is designed to develop tax systems adapted to national structures and to changes in economic sectors as an effective means of generating additional resources for development financing and the redistribution of incomes.

7.45 The objectives of this component are:

— To assist and advise Governments on tax reform planning;

— To provide guidelines for the design and development of specific taxes;

— To advise Governments on the use of tax policy and the mobilization of additional financial resources;

— To assist Governments in the improvement of their tax administration systems.

7.46 The legislative basis for this component is contained in Economic and Social Council resolutions 1271 (XLIII), 1631 (LI), 1632 (LI) and General Assembly resolution 2562 (XXIV).

7.47 A major thrust of the International Development Strategy is to emphasize the need for mobilization of domestic resources for economic development in developing countries. Since taxation is one of the most important instruments of mobilizing resources, work in this area will be strengthened.

International tax sector

7.48 This programme component is designed to promote foreign investment and international trade co-operation and to generate additional revenue for developing countries through the provision of guidelines for tax treaties and other international tax measures.

7.49 The objectives of this component are:

— To provide guidelines for tax agreements between developed and developing countries;

— To provide guidelines on (*a*) implementation of tax agreements; (*b*) effective operation of tax incentives in developing countries; (*c*) international tax evasion or avoidance; (*d*) international income allocation;

— To analyse in depth the superimposition of tax systems of capital-exporting countries over the tax systems of capital-importing countries;

— To analyse the fiscal and financial aspects of economic integration;

— To publish the series *International Tax Agreements*.

7.50 The legislative basis for this component is contained in Economic and Social Council resolutions 67 (V), 226 (IX), 378 (XIII), 486 (XVI), 1271 (XLIII), 1273 (XLIII), 1430 (XLVI), 1541 (XLIX) and 1631 (LI).

7.51 The most recent accomplishments under this component included reports on aspects of (1) dividends; (2) royalties; (3) tax sharing and alternative measures; and (4) international tax evasion and avoidance.

7.52 The need for continued work in this field on a multilateral basis has been recognized by the Economic and Social Council.

Financial policy and institutions

7.53 This programme component is designed to develop measures for promoting and mobilizing a greater volume of personal savings in developing countries; secure additional foreign exchange for those countries through the use of export credit, and ensure a rational use of the development financing available to them.

7.54 The objectives of this component are:

— To promote and mobilize personal savings through the introduction of appropriate methods and techniques and the development of the relevant institutional framework;

— To promote exports through the setting up of adequate export credit insurance and export credit financing facilities;

— To assist in the strengthening of development banks and in promoting local capital markets; and

— To carry out reforms aimed at strengthening the institutions concerned with financial policies.

7.55 The legislative basis for this component is contatined in:

— General Assembly resolution 2626 (XXV); paragraph 41;

— Economic and Social Council resolution 1630 (LI).

Private foreign investment, including transfer of enterprise-to-enterprise operative technology

7.56 This programme component is designed to analyse and review various alternatives with a view to maximizing financial, technological and managerial contributions from operation of foreign enterprises in developing countries.

7.57 The objectives of this component are:

— To carry out studies relating to the right of States to exercise permanent sovereignty over their natural resources;

— To assist developing countries in the modernization of their foreign investment laws and regulations as well as their patent, trademark and design mark legislations and regulations;

— To provide guidelines and criteria for use by developing countries in foreign investment appraisal;

— To assist developing countries, in co-operation with WIPO, in the modernization and strengthening of their industrial property offices and their administrative services for the collection, storage and retrieval of data on patents, trademarks and design marks.

7.58 The legislative basis for this component is contained in General Assembly resolutions 2158 (XXI), 2386 (XXIII), 2626 (XXV), 3016 (XXVII), and ECOSOC resolutions 1311 (XLIV), 1359 (XLV), 1451 (XLVII), 1572 G (L) and 1629 (LI), and UNCTAD resolution 39 (III), paragraph 10.

Programme formulation and management

7.59 This programme component is designed to formulate and direct the Public Finance and Financial Institutions programmes, and to co-ordinate the provision of substantive support for technical co-operation activities and advisory services in this field. It ensures co-operation with the regional economic commissions, UNESOB and other organizations in the United Nations system as well as with other intergovernmental and non-governmental organizations.

7.60 The objectives of this component are:

— To develop a work programme in the field of public finance and financial institutions in accordance with the mandate given by the governing bodies;

— To ensure the effective implementation of the approved work programme through the optimum utilization of the available resources.

Exhibit B

Programme 2.3.1: Food and Nutrition

Sub-Programme 2.3.1.1: Food Consumption, Composition & Nutritional Requirements (ESN)

1. (a) Medium-Term Objective: To acquire more accurate data on food consumption, its nutrient composition and the nutritional requirements of socio-economic groups in different ecological zones, as a basis for food and nutrition analysis and planning; to obtain information on the degree of food contamination and the ingestion of food additives.

(b) Objectives for 1974-75: To improve the methodology of food consumption surveys and, where possible, to simplify them and reduce their cost; to initiate and support survey programmes; to update and improve the accuracy of data on food composition and nutritional requirements needed for the development of food and nutrition policies at the national level.

2. Relationship to 1972-73 Sub-Programmes: This sub-programme consists of: the former 2.3.1.4 Protein Food Supplies and Consumption Studies (ESN) except the Nutrition Newsletter, which is transferred to 2.5.1.2; the former 2.3.1.5 Food Composition and Nutritional Requirements (ESN) and that small part of former 2.1.3.0. Nutrition and Home Economics (ESN) which was concerned with studies of food consumption and utilization.

3. Medium-Term Outlook: At present the analysis and planning of food and nutrition policies in agricultural planning (sub-programme 2.5.1.2) is hampered by the lack of reliable data on food consumption at the household and individual level and on the nutrient content of foods and nutritional requirements. Such data are essential to determine levels of food consumption by socio-economic groups within countries and regions, to identify the factors responsible for inequalities of distribution and nutritional deficiencies, and thereby to make accurate analyses of food situations and to establish more refined food supply/demand models for socio-economic development planning. It is envisaged that this sub-programme will have a significant impact in these directions. Some progress has already been made in Latin America and Africa, but much needs to be done in the Far East.

The sub-programme should concentrate initially upon improving survey methodology in relation to planning needs, improving the treatment and analysis of survey data , up-dating food composition tables and providing more accurate evaluation of the nutritional requirements of populations in different ecological zones. Thereafter, it should be possible to shift the emphasis somewhat more to promoting as well as planning and carrying out more accurate and reliable surveys, bearing in mind that survey output tables must be integrated into the country's food policy planning and analysis. In the next two years it is envisaged that a major effort should be made in Africa while improvements continue in Latin America and the Far East.

If adequate resources were to be available for this sub-programme in the medium term for the developments envisaged above, there would be a significant improvement in the development of food and nutrition policies in various developing countries and their integration into national agricultural and socio-economic development plans. Otherwise, the knowledge of household food consumption and budget expenditures at national and ecological levels would be delayed and countries would still have to use food balance sheet statistics which provide only average national data of limited value for planning purposes. Further, improvement of the accuracy of food composition and nutrient requirements would be delayed.

This sub-programme is of high priority in the medium term but needs only a relatively modest increase over the period to achieve its medium-term objective.

4. Progress in 1972-73: Despite economies, the basis for reorienting the priorities of this sub-programme in 1974-75 and in the medium term were laid down in 1972.73. Work completed includes up-dating of the bibliography on food consumption surveys, publication of food composition tables for Asia and the Far East (jointly with the US National Institutes of Health) and the application of FAO/WHO recommendations on energy and protein requirements to such studies as the Agricultural Commodity Projections.

5. Priorities for 1974-75: In order to meet the medium-term objective, the first priority is to improve the methodology of food consumption and household budget surveys. The first of the three volumes of the manual on food consumption surveys for international use already in preparation will be completed and used to standardize survey methods and results. The next highest priority is to relate definitions of nutritional requirements to the level of food intakes expressed in calories/joules and nutrients in various population groups, following the FAO/WHO recommendations and to identify the causes of inequalities of food consumption. In order to devote the necessary resources to these high priority activities, the work on international food composition tables and on trace element and amino-acid composition of foods will be postponed or discontinued, except for the part concerned with Africa.

6. Field Programme: As of January 1973, this sub-programme was directly supporting and indirectly participating in 10 field projects (10 experts) concerned primarily with food consumption surveys. Several requests for such surveys have been included by countries, mainly in Africa, in their UNDP programming exercize, and the number of field projects should increase several-fold in the next few years.

7. Summary of 1974-75 Work Plan - Description

Item	
1. Food Consumption Studies	Develop and standardize methodology including publication of manuals and studies on survey design, and promotion of and advice on national surveys.
2. Food Composition	Publish and continue studies for updating FAO food composition tables and bibliography
3. Nutrient Requirements	Follow up FAO/WHO recommendations to improve knowledge of vulnerable groups and of different socio-economic groups

Exhibit B

Programme Summary of 1974-75 Work Plan

Item	Global		Africa		Asia and Far East		Europe		Latin America		Near East		Total	
	MM	$	MM	$	MM	$	MM	$	MM	$	MM	$	MM	$
1	190	344 001	17	20 363	22	43 281	-	-	25	41 651	15	19 060	269	468356
2	49	64 349	14	21 684	-	-	-	-	-	-	20	19 282	83	105315
3	17	24 446	-	-	-	-	-	-	-	-	7	7 251	24	31697
Sub-Total	256	432 796	31	42 047	22	43 281	-	-	25	41 651	42	45 593	376	605368
												Cost Increase		141082
												Total		746450

Resource Summary of 1974-75 Work Plan

Region	Headquarters Input		Regional Input		Total	
	MM	$	MM	$	MM	$
Global	256	432 796	-	-	256	432 796
Africa	13	17 206	18	24 841	31	42 047
Asia and Far East	9	13 462	13	29 819	22	43 281
Europe	-	-	-	-	-	-
Latin America	9	14 666	16	26 985	25	41 651
Near East	23	29 444	19	16 149	42	45 593
Sub-Total	310	507 574	66	97 794	376	605 368
Cost Increase		123 466		17 616		141 082
Total		631 040		115 410		746 450

Budget Summary	$
1972-73 Adjusted Budget	681 851
Programme Change	- 76 483
1974-75 Base	605 368
Cost Increase	+ 141 082
1974-75 Budget	746 450

Objects of Expenditure - 1974-75 (HQ only)	$
Salaries (net) and Common Staff Costs	487 171
Consultants	18 720
Travel on Official Business	16 637
Contractual Services and Equipment (excluding Printing and Translation)	47 262
Publications Services	53 420
Computer Services	6 250
Telephones and Cables	1 580
Total	631 040

Exhibit C

MAJOR PROGRAMME 60. CONDITIONS OF WORK AND LIFE

Summary of 1974-75 Proposals and Comparison with Previous Biennia (Including Funds from Other Sources)

PROGRAMME	TITLE	MAN-YEARS/MONTHS		U.S. DOLLARS		
		PROFESSIONAL	GENERAL SERVICE	NON-OPERATIONAL ACTIVITIES	OPERATIONAL ACTIVITIES	TOTAL
60.1	DEPARTMENTAL MANAGEMENT					
	REGULAR BUDGET	4/10	4/00	210,880	-	210,880
	OTHER SOURCES	2/08	2/00	94,536	-	94,536
60.2	GENERAL CONDITIONS OF WORK					
	REGULAR BUDGET	33/03	11/09	1,162,937	312,000	1,474,937
	OTHER SOURCES	0/11	0/03	27,273	-	27,273
60.3	OCCUPATIONAL SAFETY AND HEALTH					
	REGULAR BUDGET	41/09	40/03	1,739,693	350,000	2,089,693
	OTHER SOURCES	4/04	3/09	399,591	1,885,000	2,284,591
60.4	SOCIAL SECURITY					
	REGULAR BUDGET	40/05	13/05	1,362,075	365,000	1,727,075
	OTHER SOURCES	7/11	2/03	924,625	1,480,000	2,404,625
	TOTALS					
	REGULAR BUDGET	120/03	69/05	4,475,635	1,027,000	5,502,635
	OTHER SOURCES	15/10	8/03	1,446,025	3,365,000	4,811,025
	1972-73 TOTALS					
	REGULAR BUDGET	111/05	46/06	3,339,841	532,080	3,871,921
	OTHER SOURCES	12/01	6/07	1,139,523	3,021,000	4,160,523
	1970-71 EXPENDITURE					
	REGULAR BUDGET	113/01	46/01	2,953,877	147,736	3,101,533
	OTHER SOURCES	1/06	2/09	759,350	2,991,000	3,750,350

410. The aim of this major programme is to secure the adoption and the effective implementation in member States of policies and measures designed to ensure for all their people:

(a) progressive improvement in living standards and working conditions;

(b) guaranteed minimum living standards and working conditions;

(c) a greater degree of social equality;

(d) a healthy environment.

411. In formulating the proposals for 1974-75 under this major programme it has been possible, in the case of the occupational safety and health and social security programmes, to take fully into account the results of the in-depth reviews conducted by the Governing Body at recent sessions and of the work of the Ad Hoc Committee on Occupational Safety and Health. The proposals under the general conditions of work programme, however, are of a tentative nature because an in-depth review is pending which a working party of the Governing Body is about to consider. They do nevertheless take into account the discussions in the Working Party on the Draft Long-Term Plan and recent resolutions of the International Labour Conference. In the light of these, the proposals place emphasis on such questions as conditions of work and life of migrant workers, improvement of the working environment and a greater humanisation of work.

Programme	1973-1974 Approved	1973-1974 Revalued	1975-1976	Increase (Decrease) over Revalued $	Increase (Decrease) over Revalued %
	$	$	$	$	%
Regular Programme	2,099,500	2,210,600	2,246,000	35,400	1.6

PROPOSED RESOLUTION

4.33: The Director-General is authorized to continue to assist and co-operate with radio broadcasting, television, film and visual media agencies in the production and distribution of audio-visual material on Unesco's aims and activities.

WORK PLAN

Radio Programmes. Radio feature and magazine programmes, news reports, interviews and statements on Unesco subjects will be recorded in English, French, Spanish and Russian. Productions promoting International Women's Year will be undertaken. Existing arrangements for the production of certain programmes in Arabic and in Portuguese (for Brazil) will be continued. Arrangements will be made with National Commissions for the local production of radio news reports in other languages. (Ref. 17 C/5 Approved, para. 1280) (Regular Programme: $181,800)

Television programmes and films. Existing television co-production arrangements with national organizations will be expanded in co-operation with National Commissions. The operations of the Unesco film footage library will be increased through greater intake of footage on Field projects, and short television reports will be prepared for national networks. Television producers will be given facilities and assistance for the production of their own programmes on Unesco's aims and activities. A special television programme will be produced for use in connexion with International Women's Year. The Unesco film depository system will be strengthened in order to promote greater use of the television programmes in Member States. (Ref. 17 C/5 Approved, para. 1281) (Regular Programme: $330,000)

A documentary film cinémathèque will be established at Headquarters for the purpose of presenting to the public films on education, science, culture and communication, particularly from developing countries and by young film makers. (Regular Programme: $23,500)

Photographs and exhibits. Photographs, photosheets, photo poster sets, slide sets and audio-visual programmes will be produced for the press, National Commissions, non-governmental organizations and schools. The use of colour material will be expanded to meet increasing demand. A basic colour laboratory will be set up. Photo exhibits on Unesco themes will be arranged in co-operation with National Commissions. (Ref. 17 C/5 Approved, para. 1282) (Regular Programme: $171,700)

Staff. For carrying out the activities described in this Section, the following staff will be required in 1975-1976, as compared with the staff budgeted for 1973-1974:

Category	1973-1974	1975-1976	Increase (Decrease)
Professional	18	17	(1)
General Service	21	24	3
Total	39	41	2
Costs	$1,573,600	$1,539,000	($34,600)

The decrease of $34,600 is due primarily to the abolition of a Professional post, partly offset by the proposed establishment of three General Service posts.

Exhibit E

COMMUNICABLE DISEASES - GENERAL ACTIVITIES

Ghana 1001 Epidemiological services

To assist in developing, at ministry level, an epidemiological service to plan, co-ordinate and evaluate programmes for the control of communicable diseases. Provision: an epidemiologist (continued), $22 493; supplies and equipment, $500.

ENVIRONMENTAL HEALTH

Ghana 3003 Public health engineering education

To assist in strengthening the teaching of public health engineering at the University of Science and Technology, Kumasi. Provision: a teacher of public health engineering (continued), $26 220.

EDUCATION AND TRAINING

Ghana 6041 Fellowships

Fellowships in various fields for the professional training of health personnel. Provision: $36 000.

Ghana 6201 Medical school, Accra

To assist in strengthening the teaching of students at the medical school, Accra. Provision: a medical teacher of physiology (continued), $26 700; supplies and equipment, $200; a grant, $10 000.

Regular Budget							Project No	Other Sources						Source of funds	UNICEF	
Number of posts			Estimated obligations					Number of posts			Estimated obligations				Estimated obligations	
1971	1972	1973	1971	1972	1973			1971	1972	1973	1971	1972	1973		1971	1972
			US$	US$	US$						US$	US$	US$		US$	US$
						Tuberculosis										
						Tuberculosis control	1201	1			24 400			UNDP		
						Parasitic Diseases										
						Schistosomiasis control	2101	1			21 000			UNDP		
						Communicable Diseases - General Activities										
	1	1		23 689	22 993	Epidemiological services	1001									
						Environmental Health										
1	1		7 600	22 137		Environmental sanitation	3001									
						Health component in Volta Lake research project	3002	1			49 898			FT		
	1	1		26 724	26 220	Public health engineering education	3003									
						Master plan for water supply and sewerage for the Accra-Tema metropolitan area	3201				179 608			UNDP		
						Rural water supply and environmental health	3202				137 000			UNDP		
						Public Health Services										
						Health services	4000								100 000	
			3 600			Medical care insurance	4301									
						Nursing										
2	2		30 670	40 449		Post-basic nursing education	4401									
1			18 340			Nursing education	4402									
						Health Education										
						Health education	4501	1	1		24 397	30 200		UNDP		
						Education and Training										
			36 000	36 000	36 000	Fellowships	6041									
1	1	1	31 890	38 304	36 900	Medical school, Accra	6201									
5	6	3	131 100	187 303	122 113	Total - GHANA		4	1		438 703	30 200			100 000	

V. THE APPLICATION OF OPERATIONS RESEARCH TO BUDGETING FOR INTERNATIONAL ORGANIZATIONS

While examples of goal-oriented decision making in international organizations abound and may be praised, few attempts may be noted to apply realistically techniques of operations research and policy analysis to decision making in international organizations. Most significant decision problems confronting the legislative bodies of international organizations involve the allocation of resources hopefully in an optimal fashion, to meet economic, social and political needs or demands. Operations research is a scientific method of providing policy makers with some quantitative insights as an aid to making decisions regarding operations under their influence.[1]

Viewing the work of the various evaluative organs (the Ad Hoc Committee of Experts, the Joint Inspection Unit and others), the investigator finds it evident that there is a place for operations research and policy analysis in the field of economic and social development. That is, there is need for a systematic approach to the comparison of alternative objectives and means for their attainment. The use of thoughtful and quantitative analysis would

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[1]Morse, P. M. and Kimball, G. E., Methods of Operations Research, (M.I.T. Press, Cambridge, Mass., 1951), p. 1.

certainly encourage the making of better decisions in the pursuit of optimal allocation of scarce resources among competing claims.

A. NEED FOR A COORDINATED APPROACH

A common difficulty among organizations in the UN system is that of linking their general objectives with their proposed practical activities, whether research or operational projects, especially where their contribution to the solution of economic and social problems is insignificant.

As discussed in Section IV, various attempts are being made toward arriving at a program structure which will eliminate duplication of efforts among the organizations concerned with various specific problem areas. In addition, consolidated country studies as proposed in the Joint Inspection Unit's "Report on Medium-Term Planning in the United Nations System," would assist greatly in the delineation of areas of responsibility for each organization.[2]

For the better coordination of the UN system, George H. Lane of the Department of State's Bureau of International Organization Affairs has made two important contributions.

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[2]Consolidated country studies would combine the various sectoral country studies prepared by each organization and be submitted to the governing bodies of the organizations and UNDP, and to the regional committees or councils. These documents would give a general view of the economic and social sectors in each country.

In his capacity as a member of the UN System Coordination Staff, Lane has analyzed the ACC's Annual Report on Expenditures of the United Nations System in Relation to Programs. While his efforts have been aimed at making this report more useful to the "agency directorates" within the Department of State, there is no reason why the concepts and results achieved could not be applied by the UN system to itself.

The first of Lane's Department of State memoranda is a statistical analysis of the ACC's report, with particular emphasis on expenditures and their ranking among 15 program categories listed in the report.[3] Graphical presentations are used, relating expenditure on the 15 program categories to 15 agencies and fund entities.[4]

The second of Lane's contributions, and perhaps the most useful in terms of UN system application, is a matrix manipulation exercise which shows very clearly the overlapping and possible duplication of effort by the various

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[3]These program categories, in alphabetical order, are: agriculture, forestry and fisheries; culture, social and human sciences; education; general economic, social policy and planning; health; human rights; industry; international trade; labor, management and employment; natural resources; population; relief activities; science and technology; social security and other social services; and transport and communications.

[4]The agencies and fund entities listed in the ACC report are: UN, ILO, FAO, UNESCO, WHO, ICAO, UPU, ITU, WMO, IMCO, IAEA, UNICEF, WFP, UNRWA and UNDP.

organizations in relation to the program categories listed in the ACC report.

The techniques used in these two reports are relatively simple statistical analyses and should be readily understandable to all decision makers. They are, therefore, useful tools capable of illustrating the advantages of applying operations research and systems-oriented techniques to the field of economic and social development. The systems-oriented approach is designed to assist decision makers in the discovery of preferred strategies of moving from the present into the future. It offers a way to focus and refine the judgments of those knowledgeable in international organization affairs, thus incorporating into the decision-making process both the capabilities of human judgment and formal mathematical analysis.

B. QUANTITATIVE ANALYSIS AND PROGRAM FORMULATION

E. S. Quade defines systems analysis as a systematic approach to helping a decision maker choose among courses of action by investigating his full problem, searching out objectives and alternatives, and comparing them in the light of their consequences; it employs an appropriate framework, insofar as possible, analytical, to bring expert judgment and intuition to bear on the problem.[5]

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[5]Quade, E. S., "Systems Analysis and Policy Planning," Systems Analysis and Policy Planning, edited by Quade and Boucher, (The Rand Corporation, Santa Monica, Ca., 1968), p. 2.

This definition suggests that a systems-oriented approach should be of great benefit to the analysis and ultimate formulation of programs in the UN system. Among the five examined organizations of the UN system, there were wide conceptual differences in their various experiments in program formulation. They differed in their definitions of the problems to be solved, the precision with which the general objectives were formulated and the inclusion or exclusion of information on the financial evaluation of the means to be applied.

1. Formulation of the Model

When problem areas and objectives for each organization are defined and related to an overall world plan, the processes of program evaluation and policy formulation can better accommodate--and benefit from--systems thinking and analytical techniques. One useful methodology that could then be introduced is described below. It would provide a predictive model which forecasts outcomes of proposed activities and incorporates a weighted additive value function which measures the effectiveness of each alternative.[6] The function reflects the extent to which desired outcomes are achieved by a given alternative and the relationship of these desired outcomes to defined

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[6]This methodology is based in part on Nutwell, R. M., Policy Analysis at the Department of State: A Quantitative Methodology, M.S. Thesis, U.S. Naval Postgraduate School, Monterey, Ca., 1972.

goals and objectives. The task here of program analysis is to find an alternative that leads to the most desirable, feasible outcome.

This program analysis methodology may be idealized as follows:

(1) A set of objectives, or desired outcomes, are formulated which the policy makers desire to achieve during the planning period. An example would be "to increase the use of high-yielding varieties of cereals and food legumes by twenty percent."

(2) A list is drawn up of all the activities under the province of the policy makers that would contribute to the achievement of one or more of the objectives. Examples might include a "survey of factors influencing the use of improved and high-yielding varieties of maize, sorghum and millet in Africa" and the "conduct of seminars for cereal scientists on crop breeding and improvement of cultural practices under different agro-climatic conditions."

In terms of mathematical notation, each objective defines a distinct dimension along which similar consequences can be imagined (perhaps more, or less, desirable). The aim is to find the most attractive outcome in a given dimension which is considered economically and technologically feasible. Each consequential dimension is denoted by an integer j=1,...,m, where m is the total number of dimensions (which is equal to the total number of objectives).

Within a given dimension, j, a particular consequence is denoted by the variable y_j. Each value of y_j represents an outcome somehow distinct from other outcomes or consequences along that dimension. For instance, let j = "immunization rate among citizens in Country A." Then y_j might take on

values between 30 and 80 percent. Qualitative consequences, such as the occurrence or nonoccurrence of an event, are represented as follows:

$$y_j = \begin{cases} 1 \text{ , if the event occurs,} \\ 0 \text{ , if the event does not occur.} \end{cases}$$

A feasible range of values of y_j is constructed using as an upper bound the most desirable value of y_j, called y_{jmax}, that is considered feasible. (This value will be the value of the objective in each dimension j.) The lower bound is the least desirable value of y_j, called y_{jmin}, which nevertheless is acceptable. These two values, y_{jmax} and y_{jmin}, will be used in constructing a relative value function over consequences.

An outcome, denoted $\vec{y}$, is a vector of consequences. It is defined by specifying the value of y_j for every j. Thus,

$$\vec{y} = (y_1,\ldots,y_m) \text{ ,}$$

and $\vec{y}_{max} = (y_{1max},\ldots,y_{mmax})$ is the vector of objectives.

Each of the different activity types is denoted by an integer i=1,...,n, where n is the total number of activity types. For each activity i, a variable x_i denotes the level of operation of that activity.[7] Qualitative

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[7]Quantifiable levels of activity will be expressed in whatever physical units seem appropriate (e.g., number of agricultural experts trained).

activity levels, such as taking or not taking a certain action, are represented as follows:

$$x_i = \begin{cases} 1 \text{ , if the action is taken,} \\ 0 \text{ , if the action is not taken.} \end{cases}$$

An alternative, denoted $\vec{x}$, is defined by specifying the level of operation of each of the n activity types. An alternative is therefore a vector of activity levels,

$$\vec{x} = (x_1, \ldots, x_n) \ .$$

Program formulation requires answers to two questions which may be put thusly:

(1) What outcome, $\vec{y}$, will result from each feasible alternative, $\vec{x}$?

(2) Which of all possible outcomes is most desirable?

The outcome, $\vec{y}$, of each $\vec{x}$ is derived using a predictive model, P. An evaluative model, E, finds the value of each $\vec{y}$ in relation to all other outcomes. (The prediction of costs for each $\vec{x}$ will be discussed in a later section.) It is then possible to identify the alternative that leads to the greatest value of $E[\vec{y}]$. In terms of a flow notation, the process may be illustrated as follows:

$$\begin{bmatrix} x_1 \\ \cdot \\ \cdot \\ \cdot \\ x_n \end{bmatrix} \xrightarrow{P} \begin{bmatrix} y_1 \\ \cdot \\ \cdot \\ \cdot \\ y_m \end{bmatrix} \xrightarrow{E} E[\vec{y}] \ .$$

Without getting into the precise mathematical properties of the predictive model P, it is possible to say that P is representative of reality and can be verified objectively by scientific methods. It is also necessary that P associate with each alternative a unique outcome.[8] Hence P may take any form depending on the particular circumstances.

In assessing the relative value of outcomes a quantitative procedure is used. However, it relies heavily on subjective inputs from responsible decision makers. These subjective inputs reflect expert advice on the extent to which each objective would be satisfied in a given outcome and the relative importance, in the minds of the decision makers, of the objectives in contributing to goals and interests.

In discussing the selection of effectiveness criteria in policy analysis, Charles J. Hitch and Roland N. McKean suggest:

> "Ideally, we should choose that course of action which, with available resources, maximizes something like the 'satisfaction' of an individual, the profits of a firm, the 'military worth' of the military establishment, or the 'well-being' of a group...Then we would pick the policy that promised to yield the most satisfaction, the most profits, the most military worth, or the most well-being...We do not have the ability to translate outcomes into such terms. In practical problem-solving,

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[8]It is not necessary that each outcome be associated with one and only one alternative.

therefore, we have to look at some 'proximate' criterion which serves to reflect what is happening to satisfaction or military worth."[9]

Unfortunately, such abstractions as "well-being" or "national welfare" can be adequately described only by a fairly large number of the proximate criteria mentioned by Hitch and McKean. For instance, "national welfare" might be defined in terms of such quantities as real dollars of gross national product per capita, percent of food crop productivity increase and number of trained doctors per 10,000 of population possessed by Country A. Policy or program analysis requires an evaluation, in some manner, of the relative desirability of multidimensional vectors of physical criteria.

2. Evaluation of Multi-Attributed Alternatives

Several evaluative schemes have been developed to assist decision makers in identifying preferences among "multi-attributed" alternatives. Lexicographical ordering compares the single most important outcome dimension. If two or more outcomes share the same value for this dimension, the second most important dimension is examined, and so on.[10] This model, unfortunately, is of limited value because in

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[9]Hitch, Charles J. and McKean, Roland N., The Economics of Defense in the Nuclear Age, op. cit., pp. 160-161.

[10]Fishburn, Peter C., Utility Theory for Decision Making, (John Wiley and Sons, Inc., New York, 1970), p. 48.

most multi-factor decision problems no single factor can be identified as most important.

A satisficing method has been suggested which may assist a decision maker to choose the first outcome that he finds the component consequences of which satisfy a minimum value for that dimension.[11] A problem with this model is that there may be many outcomes the components of which are at least as desirable as the minimum standard. The satisficing model can, however, help in eliminating all unacceptable outcomes.

3. An Additive Value Function

An additive utility model used in conjunction with a satisficing model is a possible strategy for choosing among multi-attributed policy outcomes.[12] This would be accomplished as follows:

(1) Eliminate all unacceptable alternatives using a satisficing model.

(2) Identify the most desirable alternative from those remaining using an additive utility function. In using the satisficing procedure, an outcome of $\vec{y}$ is unacceptable if y_j is less desirable than y_{jmin} for at least one j.

The use of an additive utility function is a common technique for the solution of problems of evaluating multi-attributed alternatives. The function itself is of

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[11] Simon, H. A., "A Behavioral Model of Rational Choice," Quarterly Journal of Economics, Vol. 69, 1955.

[12] An additive utility model evaluates each outcome by summing its scores in each dimension and comparing to the totals of other outcomes under consideration.

the form:

$$U(\vec{y}) = U_1(y_1) + U_2(y_2) + \ldots + U_m(y_m)$$

where $\vec{y} = (y_1,\ldots,y_m)$ is a member of the set Y of feasible outcomes ($y_{jmin} \leq y_j \leq y_{jmax}$, for all j). $U(\vec{y})$ expresses a relative value of $\vec{y}$ and $U_j(y_j)$ expresses a relative value of the consequence y_j. The outcome $\vec{y}$ is preferred to $\vec{w}$ (written $\vec{y} \succ \vec{w}$) if and only if:

$$U_1(y_1)+U_2(y_2)+\ldots+U_m(y_m) > U_1(w_1)+U_2(w_2)+\ldots+U_m(w_m).^{13}$$

The actual form of the additive utility model suggested here is a weighted additive value function:

$$U(\vec{y}) = w_1u_1(y_1) + w_2u_2(y_2) + \ldots + w_mu_m(y_m)$$

where the functions u_j provide an interval measure of a particular consequence y_j, relative to all other consequences in the same dimension. An interval scale is one in which the zero point and unit of measurement are arbitrary.[14] That is, they may be changed without affecting the relative lengths of intervals. The interval [0,1] will

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[13]Most of the mathematical properties and assumptions concerning an additive utility model are covered in detail in Fishburn, Peter C., Utility Theory for Decision Making, op. cit.

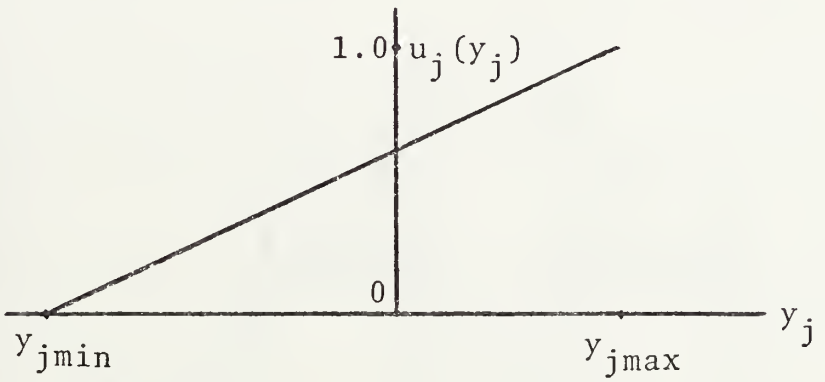
[14]Siegel, Sidney, Nonparametric Statistics for the Behavioral Sciences, (McGraw-Hill Book Co., New York, 1956), p. 27.

be used for measuring relative values. The endpoints of the interval are defined as follows:

$$u_j(y_{jmax}) = 1 \quad \text{and} \quad u_j(y_{jmin}) = 0$$

and the ratio of the values of any two consequences indicates how much more desirable one is than the other.

The worth curve, or graph of $u_j(y_j)$ as a function of y_j, will be assumed to be a straight line. That is, in general it might look like this:



A worth curve may take on any shape. However, for simplicity, a linear function is assumed.[15]

4. Hierarchy of Aims

The number w_j is the weight or relative importance assigned to outcome dimension j by the decision makers. Each w_j reflects the relationship of its corresponding

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[15]There are any number of ways to derive worth curves. One very good one is mentioned in Nutwell, Policy Analysis at the Department of State: A Quantitative Methodology, op. cit., pp. 37-38.

objective (y_{jmax}) to the broader goals that motivate policy. The concept of hierarchy of aims is used in the derivation of the weights.[16] A hypothetical hierarchy of aims is portrayed in Figure 1. Each box represents a particular aim (interest, goal or objective) labeled by a capital letter. In this example the A_j are objectives; B_1 and B_2 are goals which the objectives are intended to pursue; and C is an idealized goal, such as "improvement in production and productivity," which serves as the ultimate measure of value in the given context.

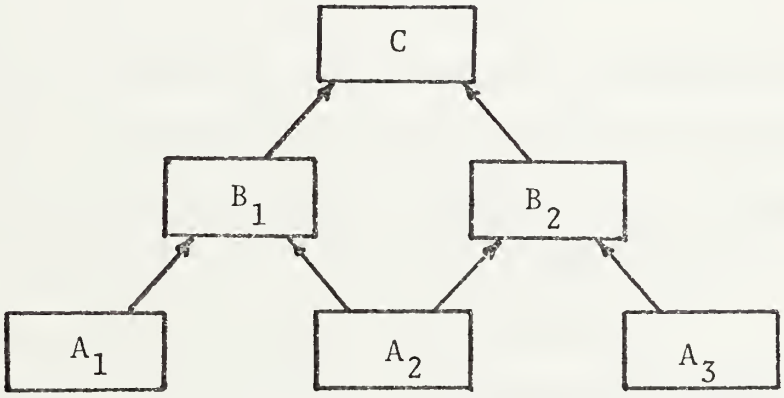

Figure 1

A hierarchy of aims is essentially a pictorial map of the structure of worth relationships residing within the

[16]Briefly the concept of hierarchy of aims says that each objective may contribute to the achievement of one or more goals. Each goal may contribute to one or more idealized goals. This format offers a way in which nebulous goals that represent the true aims of international organizations can be used systematically and consistently to motivate specific policies.

minds of the decision makers. The arrows in Figure 1 represent the relationship of aims from lower contributory ends or means to higher ones. The exact nature of this contribution is specified as follows:

$$b_k = \sum_{j=1}^{J} w_{a_j b_k} \cdot a_j, \quad \sum_{j=1}^{J} w_{a_j b_k} = 1 \qquad (1)$$

$$0 \leq w_{a_j b_k} \leq 1, \text{ for every } j, k$$

where

b_k is the relative value of aim B_k,

a_j is the relative value of aim A_j,

$w_{a_j b_k}$ is the marginal effectiveness assigned to aim A_j in contributing to aim B_k, relative to all other A-level aims that contribute to B_k. If no relationship exists between two aims, w=0,

J is the number of aims at the A level.

For goal B_1 in Figure 1, equation (1) would become:

$$b_1 = \sum_{j=1}^{3} w_{a_j b_1} \cdot a_j, \quad \sum_{j=1}^{3} w_{a_j b_1} = 1 .$$

Figure 2 is an annotated version of Figure 1 indicating relative values and contributing weights where applicable.

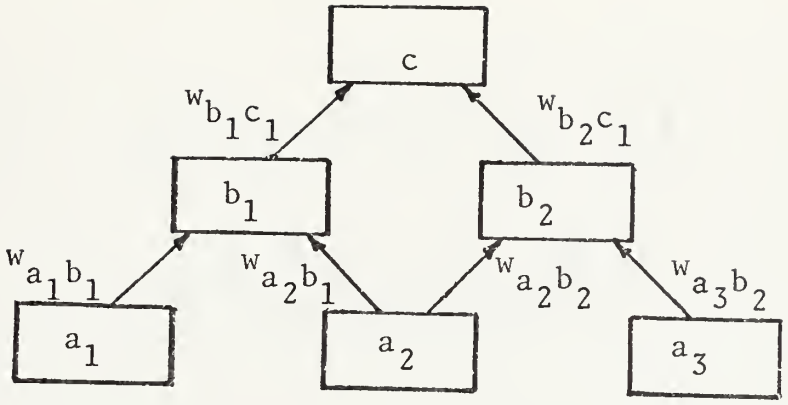

Figure 2

where

$$b_1 = w_{a_1b_1} \cdot a_1 + w_{a_2b_1} \cdot a_2$$

$$b_2 = w_{a_2b_2} \cdot a_2 + w_{a_3b_2} \cdot a_3$$

$$c = w_{b_1c_1} \cdot b_1 + w_{b_2c_1} \cdot b_2.$$

The final weight of an objective is a function of its intermediate weights and the intermediate weights of all aims that it contributes to in higher levels in the hierarchy. In Figure 2, the final weight of the $j^{\underline{th}}$ objective as it relates to the $p^{\underline{th}}$ ultimate goal, $w_{a_jc_p}$, is a function of $w_{a_jb_k}$ and $w_{b_kc_p}$, for all k. The derivation of the final weight of objective j is as follows:

$$c = \sum_{k=1}^{2} w_{b_kc_1} \cdot b_k$$

$$\text{and } b_k = \sum_{k=1}^{3} w_{a_j b_k} \cdot a_j \text{ both from equation (1)}$$

$$\text{so } c = \sum_{k=1}^{2} w_{b_k c_1} \left(\sum_{j=1}^{3} w_{a_j b_k} \cdot a_j \right)$$

$$= \sum_{j=1}^{3} \left(\sum_{k=1}^{2} w_{a_j b_k} \cdot w_{b_k c_1} \right) a_j$$

$$\text{letting } w_{a_j c_1} = \sum_{k=1}^{2} w_{a_j b_k} \cdot w_{b_k c_1} .$$

In this case the weighted additive value function becomes:

$$U(\vec{y}) = \sum_{j=1}^{3} w_{a_j c_1} \cdot a_j .$$

This procedure can be extended, demonstrating that the relative value of an aim at any level in a multi-level hierarchy can be written as a weighted sum of the relative values of all aims in any subordinate level.

In order to illustrate the manner in which hierarchy of aims is used in generating final weights required in the additive value function, the following example is presented. The hierarchy is the same used in Figures 1 and 2:

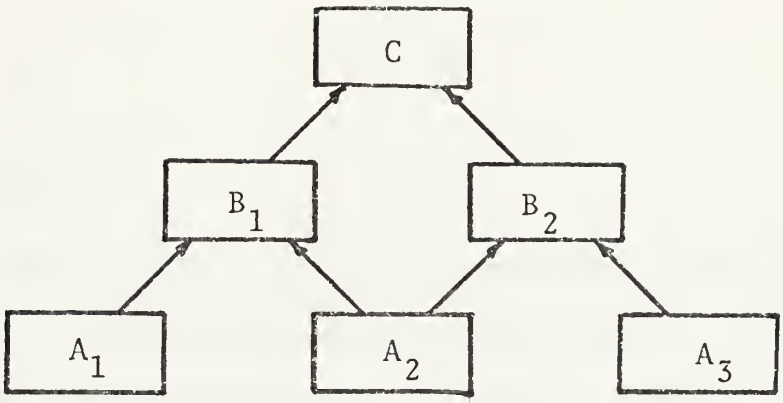

Figure 3

Consider the problem faced by decision makers in an international organization, such as FAO, in planning an economic development program for a developing nation. The following goals and objectives have been abstracted from FAO's Programme of Work and Budget for 1974-75:

C = "improve production and productivity in Country X"

B_1 = "improve the development of resources"

B_2 = "improvement and production of bio-resources"

A_1 = "increase water development by twenty percent"

A_2 = "forest tree improvement--increase yield by ten percent"

A_3 = "increase production of seed and planting material by five percent"

It is assumed that interrogation of responsible decision makers has yielded a general consensus on the following intermediate weights in the hierarchy:

$w_{a_1b_1} = .7$ $\qquad$ $w_{a_3b_2} = .8$

$w_{a_2b_1} = .3$ $\qquad$ $w_{b_1c_1} = .5$

$w_{a_2b_2} = .2$ $\qquad$ $w_{b_2c_1} = .5$

These weights imply, for example, that increasing production of seed and planting material is considered much more important than an increase in the yield of forest trees toward the improvement and production of bio-resources. By the same token, improving bio-resources and developing resources are considered equally important in the improvement of production and productivity in Country X.

The final weights for each objective can be computed using previous results:

$$w_{a_1c_1} = \sum_{k=1}^{2} w_{a_1b_k} \cdot w_{b_kc_1} = (.7)(.5) = .35 = w_1$$

$$w_{a_2c_1} = \sum_{k=1}^{2} w_{a_2b_k} \cdot w_{b_kc_1} = (.3)(.5) + (.2)(.5) = .25 = w_2$$

$$w_{a_3c_1} = \sum_{k=1}^{2} w_{a_3b_k} \cdot w_{b_kc_1} = (.8)(.5) = .40 = w_3$$

These final weights can now be employed in a weighted additive value function to measure the value of any outcome $\vec{y} = (y_1, y_2, y_3)$:

$$U(\vec{y}) = w_1u_1(y_1) + w_2u_2(y_2) + w_3u_3(y_3)$$

$$= .35\ a_1 + .25\ a_2 + .40\ a_3$$

where a_j is the relative value of objective A_j that corresponds to outcome y_j.

The relative desirability of any two vectors of objective relative values can now be computed. For example, let $\vec{y}^1$ correspond to $(u_1^1(y_1)\ ,\ u_2^1(y_2),\ u_3^1(y_3)) = (.7,\ .4,\ .2)$ and let $\vec{y}^2$ correspond to $(u_1^2(y_1),\ u_2^2(y_2),\ u_3^2(y_3)) = (.3,\ .6,\ .8)$. These outcomes, $\vec{y}^1$ and $\vec{y}^2$, in turn correspond to alternatives $\vec{x}^1$ and $\vec{x}^2$. Then

$$U(\vec{y}^1) = (.35)(.7) + (.25)(.4) + (.40)(.2)$$

$$= .245 + .100 + .080$$

$$= .425$$

$$U(\vec{y}^2) = (.35)(.3) + (.25)(.6) + (.40)(.8)$$

$$= .105 + .150 + .320$$

$$= .575$$

Thus the quantitative methodology suggests that outcome $\vec{y}^2$ is more desirable than $\vec{y}^1$. However, additional non-quantifiable factors may have to be weighed subjectively by the responsible decision maker before making a choice.

One advantage of the additive value function is that it may greatly simplify value measurements through use of the assumption that objective relative values can be derived independently of one another. This means that

reasonably small subsets of objectives can be identified, each of which contributes to a different goal at the next level, and so on. If this assumption holds, then intermediate weights can be assigned subjectively without too much difficulty.

The example used was of course over-simplified. In the real world of international organizations, the number of objectives set will be more than three. The procedure for calculating the relative values of final objectives does not change.

5. Statement of the Problem

The problem of maximizing the effectiveness of an alternative subject to a budgetary limit on resources may take the form of either a linear or non-linear programming problem. It may be expressed thusly:

$$\text{Max } E(\vec{x})$$

$$\text{Subject to } C(\vec{x}) \leq B$$

where $E(\vec{x}) = U(P(\vec{x})) = U(\vec{y})$

$C(\vec{x})$ = cost of alternative $\vec{x}$ in resources

and B = budgetary constraint in resources.

The problem will be a linear programming exercise if P, U (and thus E) and C are linear in form.[17] If any of these functions are non-linear, the problem is more

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[17]The proof that P and U linear imply E is linear is relatively simple using the definitions of P and U and the property of linearity: F is linear if and only if $F(k\vec{x}+\vec{y}) = kF(\vec{x}) + F(\vec{y})$, where k is a constant.

complicated. It may be solved, however, by using standard non-linear programming techniques.[18]

6. Developing the Cost Function

In developing a cost function, C, several principles of systems analysis may be employed. The use of parametric cost estimating relationships (PCER) may be appropriate for activities or systems that are new and, therefore, not easily verifiable. Cost estimating relationships may fix the cost in resources as a function of various physical and/or performance characteristics of the activity being estimated. For example, the cost of a particular untried training program may be estimated in terms of the number of individuals the program is desired to train.

The cost of a new building or water resource project must take into account not only development (e.g., cost of blueprints and plans) and actual building costs, but it must also consider operating and maintenance costs to the international organization concerned over the expected lifetime of the building or project. This necessarily requires the use of a technique which deals with time value of money in terms of an agreed-upon discount factor. Since system costs are distributed over a number of years, in order to compare alternatives it is necessary to cost the

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[18]See any of several references on non-linear programming, one of which is Hadley, G., Non-linear and Dynamic Programming, (Addison-Wesley, 1964).

various alternatives in terms of present costs rather than future costs.

There are several methods of dealing with the problems of uncertainty in estimation of costs for an untried system or program. In general, there will be two types of uncertainty:

(1) uncertainty due to lack of complete knowledge of the requirements necessary and

(2) statistical uncertainty depending on the model employed.

One technique used in dealing with uncertainty of requirements is sensitivity analysis. With this method it is possible to generate a "high" cost, using presumably a high limit for the value of the uncertain variable or variables, and a "low" cost, using a low limit for the value. An "expected" cost can also be computed using the expected value of the uncertain requirements variable. These high, low and expected values can be derived by talking to individuals familiar with the type of work or program to be attempted.

7. Statistical Uncertainty

Statistical uncertainty, which comes from not having complete knowledge whether the particular statistical model is correct, can be dealt with in many ways. Perhaps the best method for ease of application and verified results is a form of simulation using Monte Carlo analysis. Monte Carlo analysis is used to solve a deterministic, analytic problem by converting it to a probabilistic

analog having the same mathematical formulation. Then random sampling techniques are used to estimate the solution to the deterministic problem.[19] For instance, in the United States Department of Defense, the total system is broken into subsystems. The probability distribution for the cost of each subsystem is estimated with what is called a "beta picture," using subjectively derived values for the high and low limits and for the mode or that most frequently occurring. A typical "beta picture" is shown in Figure 4.

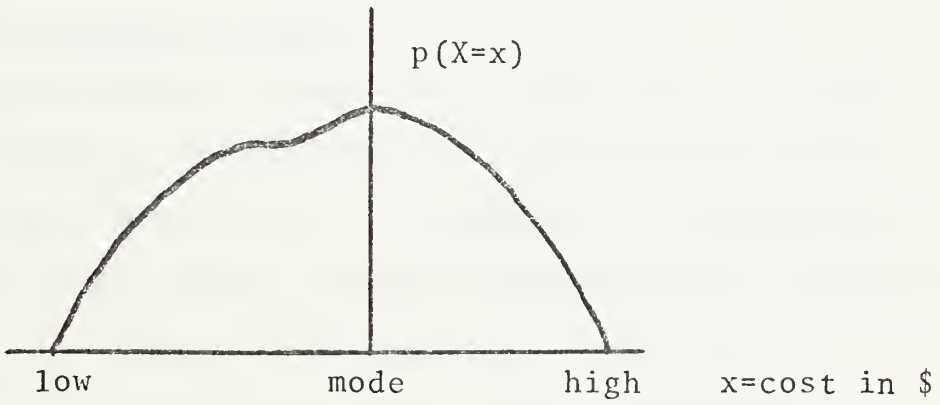

Figure 4

All such beta pictures are then aggregated, using the Monte Carlo technique, to arrive at estimated values for low and high total system cost and most frequently occurring total system cost. Clearly, this technique is easily performed on a high-speed computer.

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[19]Emshoff, J. R. and Sisson, R. L., Design and Use of Computer Simulation Models, (The MacMillan Co., London, 1970), p. 171.

C. PROGRAM PLANNING, CONTROL AND EVALUATION

An extraordinarily cumbersome and inefficient international organization complicates and frustrates the programming of their multi-faceted activities. Evidence to support this statement can be found in: (1) the number of project deadlines that are missed, nearly always resulting in supplementary requests for additional funds; and (2) programs that are dropped, after failing to accomplish their objectives within the time anticipated, usually a period unrealistically established in the first place.

1. Use of Network Theory

In any program, certain activities can or must be done before others, while some activities can be carried out concurrently with others. In addition to determining the sequence of activities, project managers must establish the method, time and cost of performing each activity. These factors constitute the basic resource requirements for carrying out public programs. When a program or project is initiated, some performance schedule is imperative. Planning is usually needed to determine resource requirements and their order of commitment to the various activities which must be performed serially in order to achieve program objectives. Control involves the monitoring of activities in such a manner as to compare actual performance with the plan and thereby ensure performance of schedules and specifications.

The application of network theory to problems of operations planning and control is a technique that has been used successfully since the earliest days of the Industrial Revolution. Such specialized forms of network analysis as Program Evaluation and Review Technique (PERT) and Critical Path Method (CPM) are applicable to the planning, monitoring and control of any type of public program, provided the following concepts are kept in mind:

(1) planning must be geared to the operations being performed; that is, the plan must be activity oriented; and

(2) reporting can either be geared to the completion (in whole or part) of activities or to the arrival at a milestone in the program.

Necessary to employing CPM or PERT techniques are:

(1) a precise description of activities; and

(2) the development of precedence relationships (activity A must be completed before activity B is begun, written A < B).

A critical path method may be employed to determine total project time by first converting from an "activity-on-node" presentation to an "activity-on-arc" one. Various network theory algorithms may then be used to determine actual time needed to complete the entire project. Lastly, a PERT/time analysis may be conducted by employing probability theory to deal with the uncertainty involved in individual activity completion time estimates.

2. Critical Path Method

An activity-on-node network is first constructed in which each node represents an activity and all precedence

relationships are shown. A simple example is shown in Figure 5. It is clear from this example that activity A must be completed before either activity B or C. The

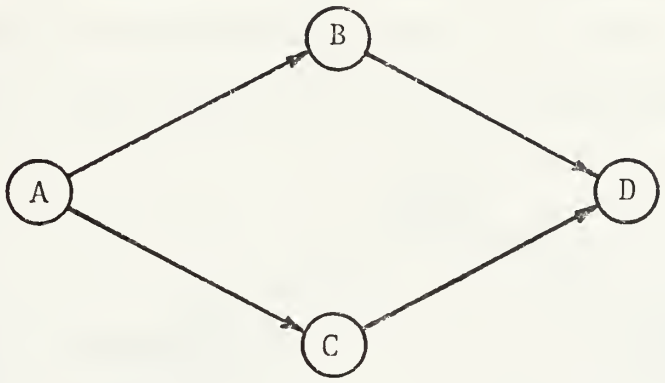

Figure 5

completion of activity D cannot take place until both activities B and C are completed. However, the completion of activity C does not depend on the completion of activity B. That is, these activities may be conducted concurrently. Before converting an activity-on-node network into an activity-on-arc network it will be necessary to define some terms and develop some notation.

The degree of a node, ν, is the number of arcs indicent with the node. It is denoted $\delta(\nu)$. The number of arcs incident into a node, ν, is denoted $\delta^{-}(\nu)$. The number of arcs incident from a node, ν, is denoted $\delta^{+}(\nu)$.

A merge node, i, is one for which $\delta^{-}(i) > 1$.

A burst node, j, is one for which $\delta^{+}(j) > 1$.

Using the example in Figure 5, an activity-on-arc network will be constructed.[20] Beginning with the

[20]The algorithm used was developed by LCDR Joseph Cyr, U.S. Navy, at the Naval Postgraduate School, Monterey, Ca., in 1974.

activity-on-node network, add a new node, called the source node which represents the "project start" event. Draw an arc from this node to all others in the original network which have no predecessor, that is $\delta^-(i) = 0$ (see Figure 5a). For each node which is not a merge node or the

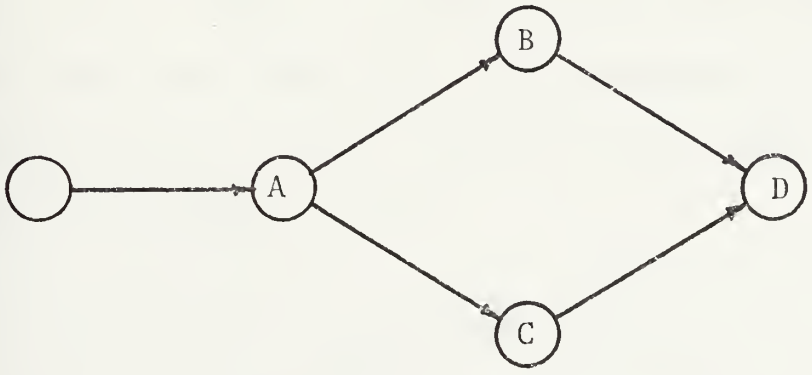

Figure 5a

source node, move the label from the node to the arc incident into it. For each merge node, change each arc directed into it to a dummy arc. Split each merge node into two nodes, one a merge node for all dummy arcs and the second node connected to the merge node by a single arc which carries the label of the original node (see Figure 5b).

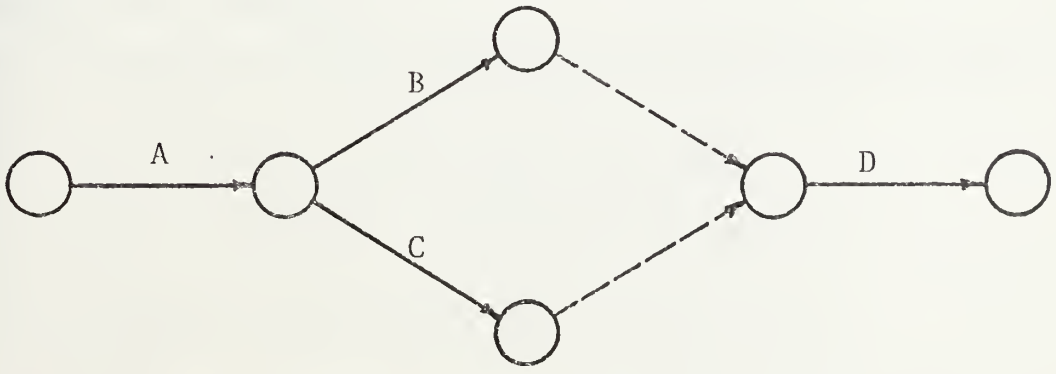

Figure 5b

Next, combine all nodes with no successor ($\delta^+(i) = 0$) into a single unlabeled node called the sink which represents the "project completion" event. In order to eliminate all unnecessary dummy arcs, determine if the dummy arc is the only arc incident from a node. If so, combine the two end nodes into a single node and eliminate all unnecessary dummy arcs (see Figure 5c). The resulting network is an activity-on-arc project network in which each node represents a milestone or event.

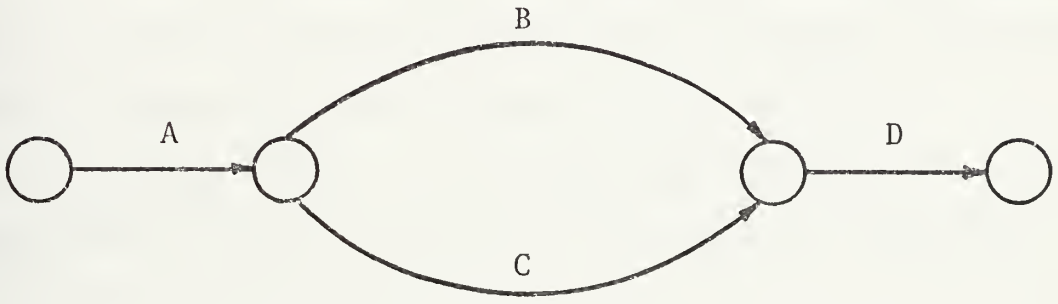

Figure 5c

In order to determine project completion time using the critical path method it will be necessary to develop more notation.

T_{ij} = estimate of mean duration time of activity (i,j)

E_i = earliest occurrence time for event i

L_i = latest allowable occurrence for event i

ES_{ij} = earliest start time for activity (i,j)

EF_{ij} = earliest finish time for activity (i,j)

LS_{ij} = latest allowable start time for activity (i,j)

LF_{ij} = latest allowable finish time for activity (i,j)

S_{ij} = total slack time for activity (i,j)

FS_{ij} = free slack time for activity (i,j)

T_s = scheduled time for completion of a project

Total slack time is the amount of time the completion of an activity can be delayed without affecting total project completion time.

Free slack time is the amount of time the completion of an activity can be delayed without affecting the earliest start time of any other activity in the network.

Using Figure 6 as a basis and estimated activity completion times as specified total project completion

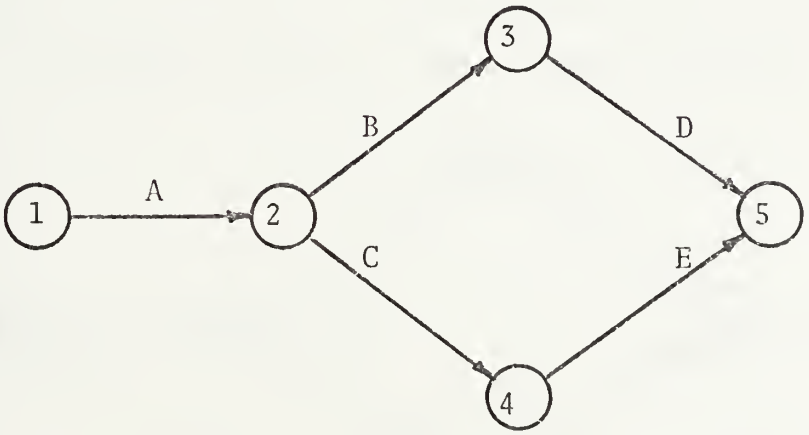

Figure 6

time will be determined using the critical path method of solution.

activity (i,j)	T_{ij}
A - (1,2)	6
B - (2,3)	3
C - (2,4)	8
D - (3,5)	5
E - (4,5)	2

First, determine the early tree* in the network using as initial conditions

$$\nu_1 = 0$$

$$\nu_i = -\infty \quad i = 2, \ldots, n$$

where n = total number of nodes.

For each node j = 2, ..., n, scan all arcs incident into j and set $\nu_j = \max_i (\nu_i + T_{ij})$. The value, ν_i, will be the earliest start time for each activity (i,j) (see Figure 6a). Determine earliest finish time for each

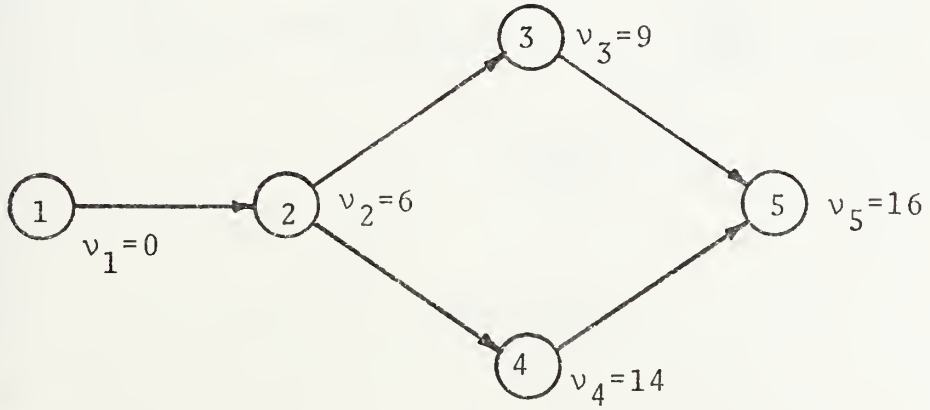

Figure 6a

*An early tree is a connected partial sub-graph from source node to terminal node which contains no cycles.

activity $(v_i + T_{ij})$. Tabulate both ES_{ij} and EF_{ij} for all (i,j). Next, determine the late tree* using the initial conditions

$$w_n = v_n$$

$$w_i = \infty \quad i = 1, \ldots, n - 1.$$

For each node i = 1,..., n - 1 scan arcs indicent from i such that $w_j < \infty$. Set $w_i = \min_j (w_j - T_{ij})$. The value w_j will then be the latest finish time of activity (i,j) (see Figure 6b). Determine latest start time for each activity $(w_j - T_{ij})$. Tabulate both values LS_{ij} and LF_{ij}. Nodes along the critical path will have $v_i = w_i$. Next determine

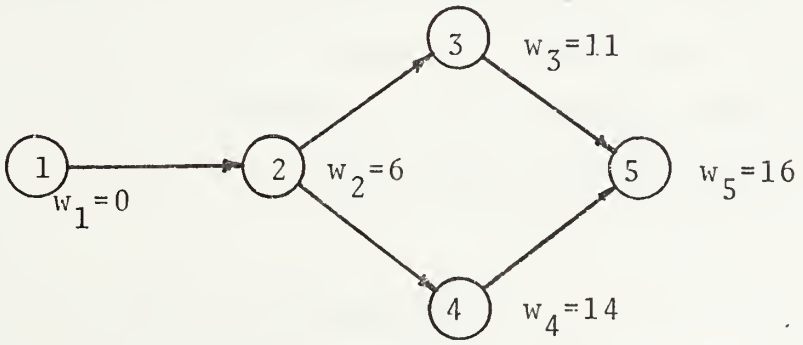

Figure 6b

and tabulate $S_{ij} = w_j - (v_i + T_{ij})$ and $FS_{ij} = v_j - (v_i + T_{ij})$ for each activity (i,j) (see Table IV).

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*A late tree is a connected partial sub-graph from terminal node to source node which contains no cycles.

Activity	T_{ij}	ES_{ij}	EF_{ij}	LS_{ij}	LF_{ij}	S_{ij}	FS_{ij}
(1,2)	6	0	6	0	6	0	0
(2,3)	3	6	9	8	11	2	0
(2,4)	8	6	14	6	14	0	0
(3,5)	5	9	14	11	16	2	2
(4,5)	2	14	16	14	16	0	0

TABLE IV

This network analysis indicates that total project completion time will be 16 and that the critical path is {1,2,4,5}. A simple extension of this procedure would assist a project manager in allocating limited resources to the various activities under his direction.[21]

Another analysis which has shown great success in project management is PERT/Cost Analysis in which project cost above normal is developed as a function of project completion time. Conversely, it is equally useful in determining change in project completion for given expenditure.

3. Uncertainty in Predictions

In applying network analysis, seldom will a program manager or analyst be able to predict the exact time duration of any given activity. The time chosen will reflect

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[21]Moder, J. J., and Phillips, C. R., Project Management with CPM and PERT, (Van Nostrand Reinhold, 1970), p. 158.

the most likely duration, which is the most probable value of an unknown probability distribution. It is virtually impossible to determine the exact probability distribution function and variance of given activities. Therefore, two alternatives are offered: (1) assume a deterministic case and use a single time estimate for each activity; or (2) assume some form of probability distribution function and establish a range of confidence. The adoption of the latter approach has led to the use of the so-called beta distribution.[22]

In using this probability distribution, it is necessary to get three estimates for each activity, either from people knowledgeable about the activities in question or from historical data. The three estimates are: most likely (m), optimistic (a) and pessimistic (b) time estimates. The expected time and standard deviation for each activity can then be computed using the formulas.

$$t_e = \text{expected time} = \frac{a + 4m + b}{6} \qquad (2)$$

and $$\sigma^2_{t_e} \text{ - variance} = \left(\frac{b-a}{6}\right)^2 \qquad (3)$$

so that $\sigma_{t_e} = \text{standard deviation} = \sqrt{\sigma^2_{t_e}} = \frac{b-a}{6}$.

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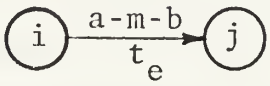
[22]Steiss, A. W., Public Budgeting and Management (D. C. Heath and Co., Lexington, Mass, 1972), pp. 274-5.

The procedure used in PERT/time analysis will be illustrated by means of the example shown in Figure 7, where the notation is as follows: 

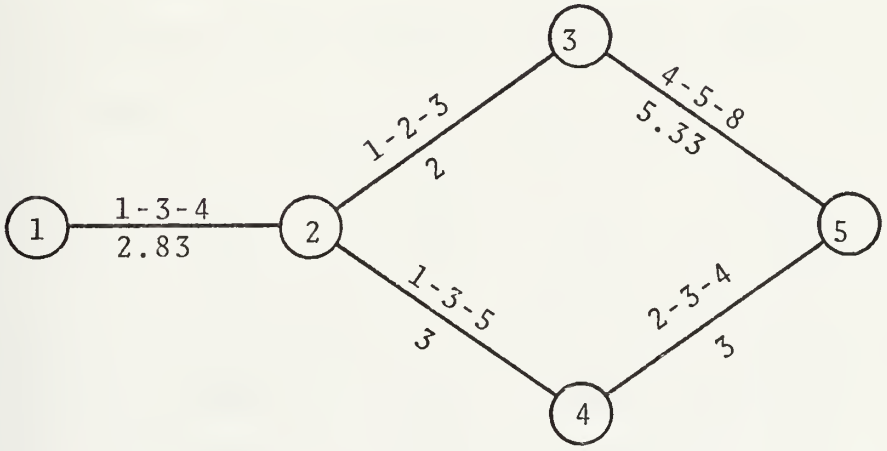


Figure 7

The variance for each activity is computed using equation (3) (see Table V).

Activity i,j	$\sigma^2_{t_e}$
(1,2)	.25
(2,3)	.11
(2,4)	.44
(3,5)	.44
(4,5)	.11

TABLE V

Using the values t_e for each activity and the rules discussed previously for determining early and late trees through a network, the earliest (μ_{E_i}) and latest (μ_{L_i})

possible occurrences for each event (node) are determined. Using the assumption of independent events and thus the fact that event variances are additive, variances for earliest ($\sigma^2_{E_i}$) and latest ($\sigma^2_{L_i}$) occurrences of each event are calculated and tabulated with the values μ_{E_i} and μ_{L_i} (see Table VI).

Event	μ_{E_i}	$\sigma^2_{E_i}$	μ_{L_i}	$\sigma^2_{L_i}$	Slack $\mu_{L_i} - \mu_{E_i}$
1	0	0	0	.80	0
2	2.83	.25	2.83	.55	0
3	4.83	.36	4.83	.44	0
4	5.83	.69	7.16	.11	1.33
5	10.16	.80	10.16	0	0

Table VI

Once these values are determined, it is then possible to find the probability that the total project completion time, τ, will be less than a specified value, T_s. Conversely, a project completion time, T_s, may be found such that the project manager has a specified level of confidence that the project completion will occur by time T_s. Individual event completion times or associated probabilities may be calculated also. The assumption that total project or event completion time is distributed as the normal probability distribution is used since project

completion time is the ordinary sum of individual independent event completion times.[23] For instance, in the example, the probability that event three will be completed in at most four time periods is approximated by:

$$F_3 = \Phi\left(\frac{4-\mu_{E_3}}{\sigma_{E_3}}\right) = \Phi\left(\frac{4-4.83}{.6}\right) \doteq \Phi(-1.38)$$

where $\Phi(x)$ is the cumulative normal probability value at x. By consulting a table of values for a normal curve, it can be found

$$\Phi(-1.38) = .0838 .$$

That is, there is less than a ten percent chance of completing event three in four time periods or less.

While the selection of three time estimates such as most likely, pessimistic and optimistic, can be a very subjective exercise, it does provide approximate probabilities for completion times. The PERT/time analysis gives a program manager the capability of estimating completion times under stochastic circumstances. Management must control a project once it is initiated. In this respect, the primary purpose of applying PERT or CPM is to create

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[23]This is a loose version of the Central Limit Theorem in Probability Theory which says that the sum of independent, identically distributed random variables is approximately normally distributed, provided that the random variables possess finite means and variances.

both a plan and a schedule and to provide management with mechanisms for continuous control over the program's operations.

D. DYNAMIC PROGRAMMING FOR RESOURCE ALLOCATION

There are many analytical techniques used to assist in allocating scarce resources among competing claims. The use of cost-effectiveness ratios, game-theoretic models and network analysis, as alluded to in the last section, are a few of the methodologies employed. These are all approaches to the problem of optimization. Optimization means finding "a best solution" among several feasible alternatives. Another technique, dynamic programming, will be examined as it relates to decision-making in international organizations.

Dynamic programming takes a sequential or multistage decision process, containing many interdependent variables and converts it into a series of single-stage problems, each containing only a few variables. The transformation is invariant in that the number of feasible solutions and the value of the objective function associated with each feasible solution is preserved.

Before embarking on a discussion of dynamic programming and its application to resource allocation in international organizations, a few important terms will be defined.

A stage is a "place" at which a decision must be made.

A state variable, x_n, is a complete description of the situation as stage n is entered.

The decision made at stage n will be denoted d_n.

The stage transformation function will be denoted t_n and will be of the form $t_n(x_n,d_n) = x_{n-1}$.

The stage return function will be of the form $r_n(x_n,d_n)$

1. Application of Dynamic Programming to Resource Allocation

   The general problem in dynamic programming is to

   Maximize $g\{r_N(x_N,d_N),\ldots, r_1(x_1,d_1)\}$

   Subject to $x_{n-1} = t_n(x_n,d_n)$, n=1,..., N

where g can be any function that we desire to optimize and N is the total number of stages in the problem.

In the specific case of the resource allocation problem, the stage is the activity to which resources must be allocated. The state variable is the amount of resources available that could be allocated. The decision is the amount of resources to be allocated. The stage transformation function will usually be $x_{n-1} = x_n - d_n$. The stage return function will be such that the success of each project is measured. There are many possibilities for the objective function, g, two of them being: (1) the desire to maximize the sum of individual project successes, or (2) the desire to maximize the performance of the worst project (i.e., maximize the minimum of individual stage return functions).

A diagram of the basic dynamic programming problem is shown in Figure 8. Without going through any of the mathematical derivation, the solution to the dynamic

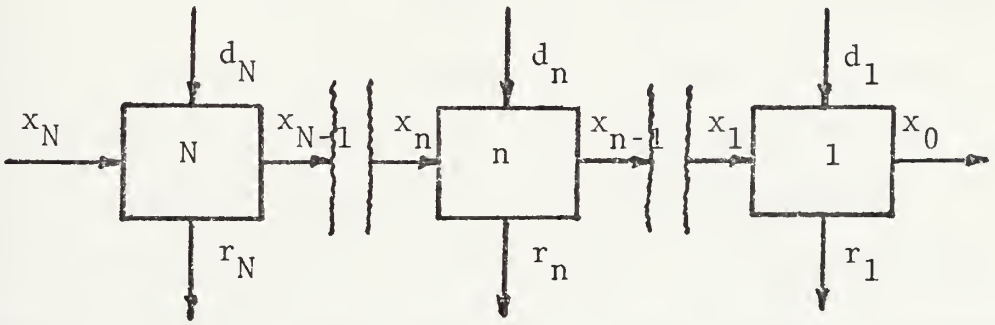

Figure 8

program problem is based on the recursive equations

$$f_N(x_N) = \max_{d_N} \{g_N(x_N, f_{N-1}(x_{N-1}))\}$$

where $$f_{N-1}(x_{N-1}) = \max_{d_{N-1}} \{g_{N-1}(x_{N-1}, f_{N-2}(x_{N-2}))\}$$

and so on.

2. A Simple Example

To illustrate the applicability of dynamic programming to resource allocation problems, let us suppose that we have three health projects in Country Y among which the total budget of $M million must be divided. These projects are:

(1) the training of medical personnel in Country Y;

(2) the immunization of inhabitants of Country Y; and

(3) the establishment of clinics in Country Y.

It is assumed that the return for each of these projects can be specified as a function of the amount of resources allocated to that project. The return from project number one will be two times the amount of resources allocated squared; the return from project two will be twice the amount of resources squared plus a constant; and the return from project three will be equal to the resources allocated to project three squared. The objective function we wish to maximize is the sum total of individual project returns.

The problem can thus be formulated as follows:

$$\underset{d_3,d_2,d_1}{\text{Maximize}} \; (2d_1^2 + 2(d_2^2 + 50) + d_3^2)$$

$$\text{Subject to } 0 \leq \sum_{i=1}^{3} d_i \leq M \; .$$

Clearly, it will not be possible to allocate more than the state variable for a given project. We therefore have an implicit constraint

$$0 \leq d_n \leq x_n \; , \quad n = 1,2,3.$$

The recursive equations are as follows:

$$f_3(x_3) = \max_{0 \le d_3 \le x_3} \{d_3^2 + f_2(x_2)\}$$

$$f_2(x_2) = \max_{0 \le d_2 \le x_2} \{2(d_2^2 + 50) + f_1(x_1)\}$$

$$f_1(x_1) = \max_{0 \le d_1 \le x_1} \{2d_1^2\} .$$

The stage transformation functions for this example are $x_{n-1} = x_n - d_n$ for all n. Under the assumption that there is little or no benefit in having any resources left over $x_0 = x_1 - d_1 = 0$, which implies $x_1 = d_1$. Therefore

$$f_1(x_1) = \max_{0 \le d_1 \le x_1} \{2d_1^2\} = 2x_1^2$$

and $$d_1 = x_1 = x_2 - d_2 .$$

Then $$f_2(x_2) = \max_{0 \le d_2 \le x_2} \{2(d_2^2 + 50) + 2x_1^2\}$$

$$= \max_{0 \le d_2 \le x_2} \{2(d_2^2 + 50) + 2(x_2 - d_2)^2\}$$

which simplifies to

$$f_2(x_2) = \max_{0 \le d_2 \le x_2} \{4d_2^2 + 2x_2^2 - 4x_2 d_2 + 100\} .$$

By taking the derivative with respect to d_2 the solution is

$$f_2(x_2) = x_2^2 + 100$$

and $$d_2 = x_2/2 = (x_3 - d_3)/2 \ .$$

Then $$f_3(x_3) = \max_{0 \leq d_3 \leq x_3} \{d_3^2 + x_2^2 + 100\}$$

$$= \max_{0 \leq d_3 \leq x_3} \{d_3^2 + (x_3 - d_3)^2 + 100\}$$

which simplifies to

$$f_3(x_3) = \max_{0 \leq d_3 \leq x_3} \{2d_3^2 + x_3^2 - 2x_3d_3 + 100\} \ .$$

Again, taking the derivative with respect to d_3

$$f_3(x_3) = \frac{x_3^2}{2} + 100$$

and $$d_3 = \frac{x_3}{2}$$

since x_3 was specified as being M million dollars, the solution is

$$d_3 = M/2$$

$$d_2 = x_2/2 = \frac{x_3 - d_3}{2} = (M - M/2)/2 = M/4$$

$$d_1 = x_1 = x_2 - d_2 = (x_3 - d_3) - d_2 = (M - M/2) - M/4$$

$$= M/4$$

and $$\max_{d_3, d_2, d_1} (2d_1^2 + 2(d_2^2 + 50) + d_3^2)$$

$$= \frac{M^2}{2} + 100 \ .$$

This solution indicates that in order to maximize the sum of individual project performance, the decision maker should allocate one-half of the available resources to project three and split the remaining available resources equally among projects one and two. While this contrived example is overly simple, it demonstrates the applicability of dynamic programming techniques to resource allocation problems.

As the problem would become more complicated, the solution procedures become more complex. There are several methods employed in solving dynamic programming problems. If the range of all possible values for d_n can be shrunk by "discretizing" the problem, a form of solution called tabular computations is quite useful.[24]

E. COMPUTERIZED INFORMATION SYSTEM FOR CONTROL AND FEEDBACK

One common quality of almost all analytical techniques, and certainly those discussed in this chapter, is the applicability of high-speed computers. The computer can be an extremely useful tool in the solution of decision problems facing international organizations. Additionally, they would serve the purpose of an integrated information system for use by all members of the UN system.

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[24]Tabular computations and other forms of solution are discussed in detail in Nemhauser, G. L., Introduction to Dynamic Programming, (John Wiley and Sons, Inc., New York, 1966).

High-speed computer systems today offer tremendous capabilities in the areas of information storage and retrieval.[25] It is important for each member of the UN system to insure that all applicable data gets into the UN computer system. It is also the responsibility of each member agency to use the computer system in making decisions which apply to economic and social development.

In the next chapter, a comparison of efforts made by the five examined organizations will be formulated. The idea behind this comparative analysis is to improve the procedures used by one organization as a result of knowledge gained by another organization.

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[25]A recently developed computer programming language which has shown great advancements in the information storage, manipulation and retrieval processes is called PL-1.

VI. A MORE EFFECTIVE UN SYSTEM: A COMPARATIVE ANALYSIS OF AGENCY EFFORTS

A. RECOMMENDATIONS FOR AGENCY COORDINATION WITHIN A UN SYSTEM

As yet nobody, no UN agency and no group of member governments, has created and published an overall UN multi-agency plan of action to cope with, much less overcome, the already obvious and simultaneous world crises: the population crisis, the environmental crisis, the world food crisis, the energy crisis, the raw material crisis, the unemployment crisis and the overall political and moral crisis revealed everywhere. The management problem stems in part from the fact that the business of problem solving and planning is scattered and unconnected among diverse agencies both within and without the UN system, while real solutions needed are interdependent and part of a whole reality. There is an obvious need for harmonization in the planning undertaken by the UN and other individual agencies.

As an initial step in the harmonization of the planning systems, the selection of a common period for the presentation of the medium-term plans of the five examined organizations would seem desirable. The six-year period 1978-1983 (as suggested by the JIU in its "Report on Medium-Term Planning in the United Nations System") would seem most convenient for the organizations involved. The reasons

for this selection are two-fold:

(1) a six-year period would necessitate the least reorganization in terms of all five organizations (FAO, ILO and UNESCO already operate with six-year periods, WHO and the UN being the exceptions); and

(2) the interim period between the present and 1977 would allow for "tooling up" within all the organizations prior to initial implementation of the common planning cycle.

In terms of presentation of medium-term planning documents, there appear to be many areas for potential improvement. Since WHO has not as yet decided to adopt a genuine medium-term plan[1] and the UN is in the process of evaluating its first medium-term plan (1974-1977), it would be unfair to include these two organizations in any comparative sense with FAO, ILO and UNESCO. These organizations have had at least two years experience with a medium-term plan and, in particular, incorporating it into their respective budgets.

The relationship between the various aspects of the medium-term plan, particularly objectives, both long and short term, and past accomplishments in continuing programs, is of vital importance in a program budgeting system. As regards the incorporation of these substantive facts into the budget documentation, FAO appears to have the lead.

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[1]It should be remembered that while WHO has been producing "general programs of work for a specific period" since 1952, the agency has not yet decided to adopt a true medium-term plan.

The presentation of FAO's budget is both clear and informative (see Section IV, Appendix I, Exhibit B). While ILO, in most cases, mentions the objectives and recent actions aimed at achieving these objectives, it is done in a very cloudy fashion. For most programs and/or sub-programs, although the information is present, it is difficult to find. In UNESCO's case, a fairly detailed plan of work for the coming budgetary period is delineated; however, objectives, either long term or immediate, are not specifically shown at all. They are mentioned in the plan of work, but vaguely. Past accomplishments on continuing programs are listed only in a smattering of cases, but without any consistent form.

Based on these last apparent shortcomings, it would appear that FAO should be better off than the others in terms of listing objective specifications.[2] This is not the case. It is very difficult to find a clear "winner" among the three organizations. As regards the nature of the objective, all three agencies seem to be fairly consistent in discussing this specification.[3] The geographic areas of intended field activities and research programs are listed in most cases, except for ILO field activities.

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[2]From the definition in the Introduction: (a) what, (b) the extent, (c) who, (d) where, and (e) when.

[3]With the exception of training activities on the part of ILO.

As for whom an objective is intended and the duration of activities aimed at achieving objectives, information is mixed. Terminal dates for projects undertaken by UNESCO are given in most instances, while specific accomplishment dates are not given in the budgets prepared by FAO and ILO. The intended recipients of economic and social development projects are most often not indicated. The exceptions are research projects, for which all three agencies specify the portions of society at which the project is aimed in most cases, and the area of promotion and communication of ideas and beneficial suggestions, in which ILO and UNESCO are doing a satisfactory job. The extent of the objective to be attained or the level of intended activity is shown only in the field activity sections of the budgetary documents of FAO and UNESCO.

In order to achieve a consolidated program budget format for the UN system, it would be necessary for all agencies involved to think and plan along the same wavelength in terms of objectives and budgetary make-up. Unfortunately, as matters now stand, each organization is operating in a totally independent fashion. It is worse than a case of the right hand not knowing what the left is doing. This is a case of each organization knowing what the others are doing (or, at least, having the means available to gain this knowledge), and then proceeding in a manner that apparently ignores whatever information is exchanged or available.

Interagency negotiations simply must take place and often within the planning and budgetary cycles. Not only must governing bodies talk to one another, but they must have some basis upon which to talk. In other words, there needs to be some mechanism for receiving information about UN system problems rather than individual agency problems in economic and social development. The consolidated country studies (for all geographic sectors combined), suggested by Inspector Bertrand and the JIU, seem to be a potential answer to the problem of diverse decision-making processes.[4] These reports would contain data on technical cooperation problems, so that the individual governing bodies can take decisions in their respective areas of competence and make recommendations on related and neighboring areas. The studies, of course, should be reviewed and updated as often as is practicable. Through exchanges between the governing bodies of recommendations and information on decisions taken, it would be possible to draw up a general program of technical cooperation for the UN system. It would then be possible to integrate the general program by sections in each organization's medium term plan.

As present methods exist, the scope and multiplicity of tasks listed in the plans and programs of the

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[4]"Report on Medium-Term Planning in the United Nations System," op. cit., pp. 149-150.

international organizations must cause concern to those evaluating the efforts of the UN system in economic and social development. Inspector Bertrand of the JIU states:

> "That these organizations should incorporate in their programs practically every conceivable subject--whether it be peace, human rights, population, environment, youth, development strategy, narcotic drugs, technical assistance, technology, science, social problems and so on--that they should find it feasible to do so, and that they should at the same time succeed in proposing solutions and even in obtaining some results in each of these sectors, would appear to be very much against the odds"[5]

Clearly an attitude of specialization seems to be the answer, rather than the generalist-type approach taken heretofore. FAO and WHO, being more specialized agencies to begin with, have been less guilty of stepping across lines of responsibility in the past. However, it is imperative for all organizations to assume a more specialized attitude in problem and program formulation, in order to put a curb on program expansion which is so incompatible with the paucity of these organizations' resources.

B. A COMMON APPROACH TO PROGRAM BUDGETING

Despite the current diversified approaches taken by each agency, their program budgets are moving toward a common format. In reviewing the several examined organizations' recent program budgeting attempts, one finds it necessary to recall some of the concepts of program

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[5]Ibid., p. 80.

budgeting as they may apply to international organizations and try to uncover where improvements may be needed.

Since program planning and budgeting is a method of allocating scarce resources among competing projects, one vital concept is the careful prediction or measurement of the costs of all resources considered necessary in conducting a project. The budget will show two-year requirements while the medium-term plan will show those resource requirements which extend beyond the biennium. When costs cannot be accurately measured, methods such as those described in Section V are quite useful. It goes without saying that, consistent with a common program budgeting system, a single cost format is necessary also. Not only should the presentation format be similar, but also the sources of cost measurements and procedures used for predicting costs should be the same.

The main purpose of a program, planning and budgeting system, with its emphasis on objectives and outputs, is to allow decision-making bodies to compare and evaluate different alternatives to achieve particular ends. Necessary for this comparison and evaluation are the identification of outputs and the selection of a measure of effectiveness. Not only are decision-makers given the capability of systems-oriented alternative analysis, but effective analysis is a requirement for an efficient and smooth-running program planning and budgeting system. Several

quantitative decision models have been employed, one of which is developed in Section V. The various agency secretariats must take advantage of these decision models in order to ensure the most efficient allocation of resources possible. The capability of budgeting scarce resources against planned objectives means that program planning and budgeting becomes a useful tool in policy-making for international organizations.

Since the emphasis in program planning and budgeting is on output and objectives, the system itself provides for evaluation of ongoing programs with relative ease. The evaluation of program efforts can be conducted using any of several analytical techniques. One, network analysis, was discussed in Section V. The evaluation phase of program planning and budgeting serves two vital purposes:

(1) it assists greatly in the service of the three functions of program planning and budgeting--control, management and planning; and

(2) it provides a vast information base from which costs, benefits and data on risk may be extracted in the selection of future program alternatives.

In summary, the use of analytical techniques such as those described for costing, decision-making and evaluation should enable secretariats to prepare more reliable budget estimates and better program budgets by having to rely less on intuition and guess-work.

C. COMPETITION WITH BILATERAL ASSISTANCE PROGRAMS

It has been long obvious that the UN system is, in a sense, in competition with programs of bilateral assistance. The efforts of the UN system are being scrutinized carefully. After all, when a bilateral assistance program appears to do a better job at less cost than a UN system program, the inclination of donor nations as well as less-developed countries will certainly be to avoid the intrusion or complication of multilateralism. The UN system, therefore, must be able to provide, and appear to provide, the most effective form and kind of action. The UN system, because of its special character,[6] should be the best forum and agency for recognizing, furnishing and supervising the various needs which characterize today's less-developed nations.

The UN system of organizations must, out of financial as well as political necessity, take advantage of every device which can make, and be seen to make, more efficient use of scarce resources. Program budgeting and, more specifically, the analytical techniques associated with program budgeting, are two of those devices.

It must be understood that program budgeting, no less in international organizations than elsewhere, must be a blend of both quantitative and qualitative factors and

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[6]The UN system is a very general organizational system made up of highly skilled, but specialized agencies.

processes in the formulation of policy. It is hoped, however, that the wider employment of quantitative analytical techniques, such as those proposed in this thesis, and greater use otherwise of rational rather than opportunistic approaches to problem solving, will contribute to a better and, eventually, more adequate allocation of resources throughout the UN system. It is fundamental to this aim that a more accurate and effective information system be established and other capabilities created upon which all qualitative analysis depends.

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